impressive

ISSUE 1/2022

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Dear reader

There is no substitute for a personal conversation. This remains absolutely true even in times where digitalisation is on the increase.

There is no doubt about it, Big Data has become an indispensable part of daily life. But is it not also true that we all feel the most benefit from a direct exchange of information and experience? As your clothing specialist, we look closely, listen carefully and make your production goals our business.

In this issue, for example, you can read how rising energy prices can be countered by perfectly matching products and service. Our customer De Jong Packaging was able not only to make significant energy savings, but also do without the use of chemicals.

The value of consistent and close dialogue and the expansion of long term partnerships is made clear in our interview with Sales Manager Michael Dick. The closer and more intensively we can coordinate with you, the better the joint solutions that we can find.

We recently celebrated the 50th anniversary of our site in Spain, Heimbach Ibérica. Francisco Cascon, Technical Manager at our Competence Centre for Dryer Fabrics explains, among many other things, the quality advantages offered by today's technology.

And finally we caught up with Thomas Friedewald from the Paper School in Altenburg to talk about the subject of young talents in the paper industry, and how he sees the future.

With this in mind, I look forward to a new year in which we will maintain regular contact and where hopefully we will be able to shake hands once again.

Best wishes

Marco Esper
Chairman of the Management Board (CEO)

„More than ever, it's about making real contributions."

impressive talks to Michael Dick –
Sales Director Europe, Middle East, Africa and Latin America

Mr Dick, You have been with Heimbach for 20 years and at the end of last year took over responsibility for sales to Europe, Middle East, Africa and Latin America. An extensive area with significant demands on the part of your customers. How prepared are you for this task?

I have a natural affinity for technical subjects, and my heart has always been in sales. Maybe that is anchored in my genes, as my father was a mechanical engineer and my mother was a full-blooded and committed saleswoman. In addition, I have always had an interest in other countries - their people, histories and cultures.
In my eyes these are ideal prerequisites for this job. And of course the right tools that I picked up in my first year at Heimbach in the TASK Department. Whether it concerns a buyer, production manager or a machine operator, the specific challenges, tasks and needs are absolutely familiar to me.

If I could give an example from the field of sport: the most successful coaches have usually played football themselves in the past. In short: I know the rules, am familiar with the team and speak their language.

The market is changing rapidly. What, in your opinion, will your customers expect from their suppliers in the future?

Change was, is and will remain the greatest constant in our market. More than ever, it's about making real contributions. Targeted understanding and solution-oriented support, sometimes away from clothing issues, are becoming increasingly important here. So for example, even though at this time we cannot avoid the addition of water in production we are all the more able to influence energy input. In future the main focus must more than ever be on making our customers' production as profitable as possible and jointly implementing the papermakers' specifications. Just as crucial to us: bringing new ideas into play, providing impulses, whether the goal is to reduce costs, increase productivity or diversify.

What does that mean, in concrete terms, for sales to Europe?

Understanding the many and complex processes of a plant requires a great deal of know-how and experience. That is why we employ a number of highly-qualified paper and machine engineers in our sales department. We will continue to expand this expertise. After all, trouble-shooting and coaching are more in demand than ever. This means: In conjunction with our entire sales team we will push benefit-oriented know-how, with a clear focus on essential improvements around the paper machine. The main thing here is to develop long term partnerships that offer added value to our customers. We set the bar very high and always want customer feedback that cooperation with Heimbach brings cash. „Customer recruits customer" would be the ideal scenario.

„The more intensively we interact with our partners the better the solutions that we find, even – or especially – in challenging times."

Long term partnerships sounds good. How would these be structured?

Our sales team is positioned in such a way that we can sell more than just clothing. My colleagues and I always maintain close contact with our customers. We both want and need to understand their machines and processes in order to be able to implement their requirements and production goals. Seeking the right clothing design is only one factor here. It is also a matter of reacting flexibly to changes in the market through personal and lasting cooperation ... whether the topic is raw material availability, waste paper quality or one of many others. I am convinced: the more intensively we interact with our partners the better the solutions that we find, even – or especially – in challenging times.

Do you have a concrete example of the choice of suitable designs being able to meet production goals?

Let's use Atromaxx as an example. Thanks to its multi-axial, modular concept we can perfectly match the felt specification to the specific requirements of a particular press configuration as well as the paper or board quality produced. We can address key issues such as void volume, fibre anchorage and strength in a more targeted way. Since with Atromaxx we have many individual modules there are significantly more combination options than with conventionally woven products. We are constantly expanding our NewTech programme – with non-woven modules too.

The subject of location seems to be an issue everywhere. Not least because of the current problems with supply bottlenecks for raw materials and technical accessories. What is your strategy?

At the latest since Corona we have learnt just how essential procurement policy is for the success of a company. If you rely on just one source the risk of bottlenecks in supply is very high. With our „local for local" strategy we are very well positioned. Heimbach has PMC locations in both Europe and Asia. The flexibility that this gives us is more important now than ever. And of course, at the same time we are looking to achieve our ecological goals and reduce our CO_2 footprint.

„In future the main focus must more than ever be on making our customers' production as profitable as possible and jointly implementing the papermakers' specifications."

Security of supply provided by location of plants in both Europe and Asia

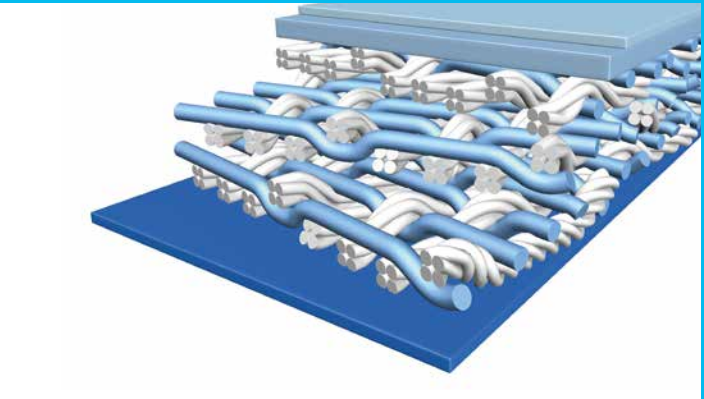
At the beginning you referred to Heimbach as a troubleshooter. What exactly should a papermaker understand this to be?

After 20 years of international service I am always fascinated when I see copies of our TASK folders dating from the 1990's on the shelves of our customers. And I know that they are not just sitting there.
The information contained is still relevant and of use even today. On the one hand, this makes us happy and, at the same time, it confirms that despite all the digitalisation and remote assistance, experts who can help quickly and in a solution-focused manner are still very much needed. And that is precisely what Heimbach stands for.
With many years of clothing expertise, specially developed measuring equipment and sophisticated diagnostic techniques we share our knowledge with our customers. You can read about one of many examples of this on page 20.

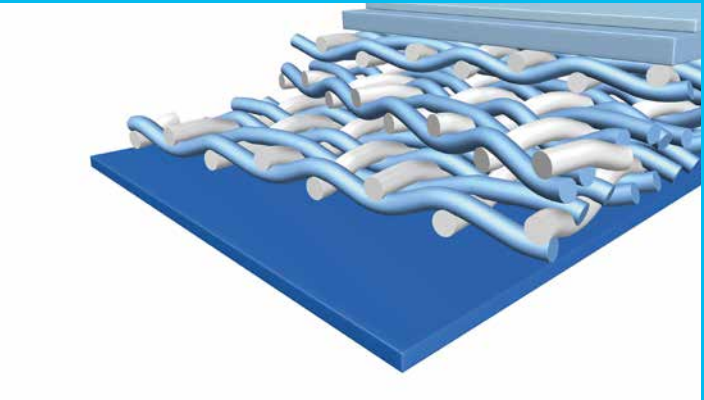
One last question on the growth market of Tissue. How are you positioned here?

Of course, we have been observing the increasing demand for household and hygiene papers since well before the pandemic. Changing lifestyles due to Corona will also ensure that this demand continues to grow. In sales we have taken the appropriate action and set up a core „Tissue Team" with the job of tailoring our products to the specific needs of the tissue sector. Here, too, the reduction of energy consumption through clothing design is at the top of the agenda.

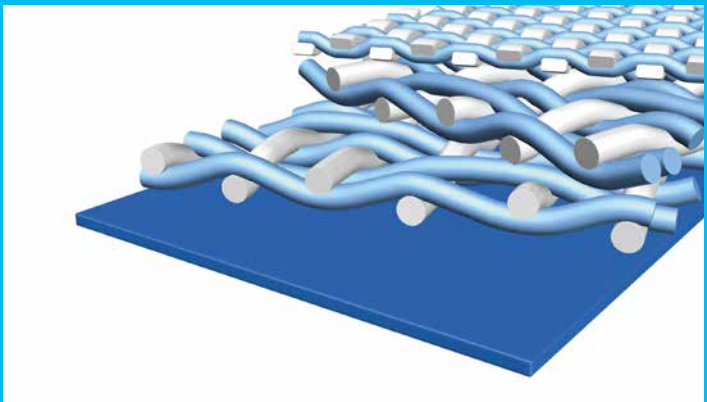
Multiaxial concept in a modular design



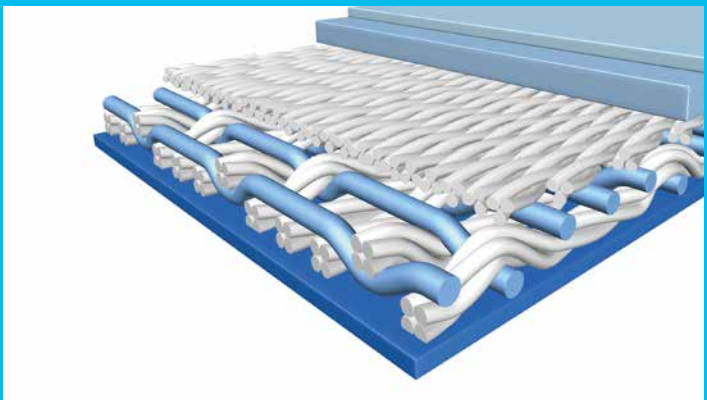
Atromaxx - in special 1+1+1 construction



Atromaxx.M consists of monofilaments only



Atromaxx.XF with flat monofilaments in the top layer



Atrojet – Non-woven module

50 years of history

impressive in discussion with Francisco Cascón – Technical Director, Heimbach Ibérica

Germany, Spain, Belgium, Switzerland, England and China. We have reported on our various locations in Europe and Asia from time to time in earlier editions of impressive. In this issue we take a detailed look at our plant on the Iberian peninsular, more precisely in the medieval city of Burgos. This is because we had a special cause for celebration here last year: the 50th birthday of Heimbach Ibérica. In our interview with Technical Director Francisco Cascón we take a look back as well as discussing the here and now.

Mr Cascón, after half a century of production activity in Burgos, you certainly have a lot to tell. Can you even begin to compare today's technology with that of yesteryear?

I have a counter-question. Can you even remember the telephone of the seventies? Then just think of the latest smartphone and you have the answer. It's the same in our field, a lot has been revolutionised since we started production.

Let's firstly take a look at warping. Unlike in the past, today every single bobbin is checked for tension. Back then, there was just a general check for all the bobbins together. So we produce a far more homogenous fabric that is much less prone to exhibit waviness.

A lot has also happened in weaving. A modern weaving loom delivers a specific amount of warp yarns at any given time. This means that, come what may, the tension is always the same. This also leads to a far more uniform fabric than was produced in the early days. And all this occurs, of course, at two to three times the speed.

The technological leaps continue as we move into heat-setting where, thanks to the air through compact system, we have long since eliminated temperature differences between the paper and machine side of our fabrics. And finally in the seaming department, the joining process is today carried out automatically instead of by hand.

There speaks the lover of technology. What does the papermaker have to gain from all this innovation?

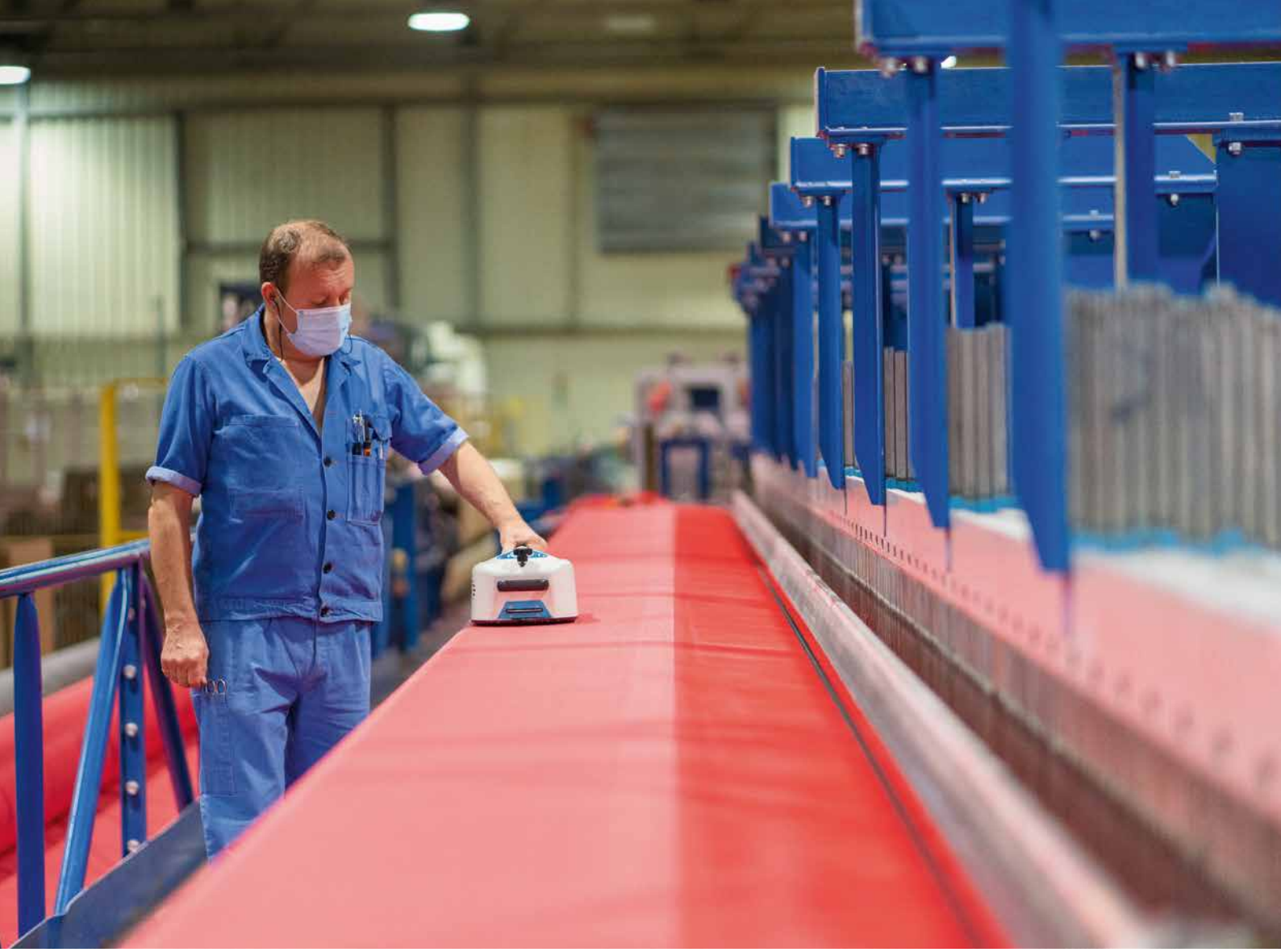
One thing above all else: a consistently high quality of fabrics in his machine. Thanks to the state of the art that we currently have, our products stand for maximum reproduceability. So fluctuations in quality have long been a thing of the past.

Francisco Cascón

Burgos became a Centre of Excellence in 2020. What is behind this?

In keeping with our objective to minimise the risk of downtime and increase flexibility in production, we are set up within the Heimbach Group in such a way that we always manufacture at minimum two locations in parallel. This applies to forming fabrics, press felts and dryer fabrics. This strategy is of particular importance in todays world, where bottlenecks in the supply chain can occur from time to time.

So we have a Centre of Excellence for each product group. For dryer fabrics, this is Heimbach Ibérica. Each Centre of Excellence is divided into various areas of responsibility and specialist departments. For example, my colleague Ruben Mosquera is in charge of Strategic Product Management whilst I have responsibility for Product Development, Quality Management and the Laboratory. We see a great advantage in the proximity this gives us to product management. This enables us to respond flexibly and quickly to customer wishes, and to drive development forward.



How do you know when the time is ripe for a new product?

There are usually several clues. Just as production processes and facilities are subject to constant change, so are customer requirements. This can apply for example to wear potential, fabric stability, resistance to hydrolysis, or contamination resistance. And of course, we are supported in drawing conclusions by our quality management. At this point I should mention: there is no universal dryer fabric that can meet all requirements. Every paper machine is unique in its specifications. The dryer section therefore also needs tailor-made fabrics. Even identical machines can require different applications.

Who participates in the development process?

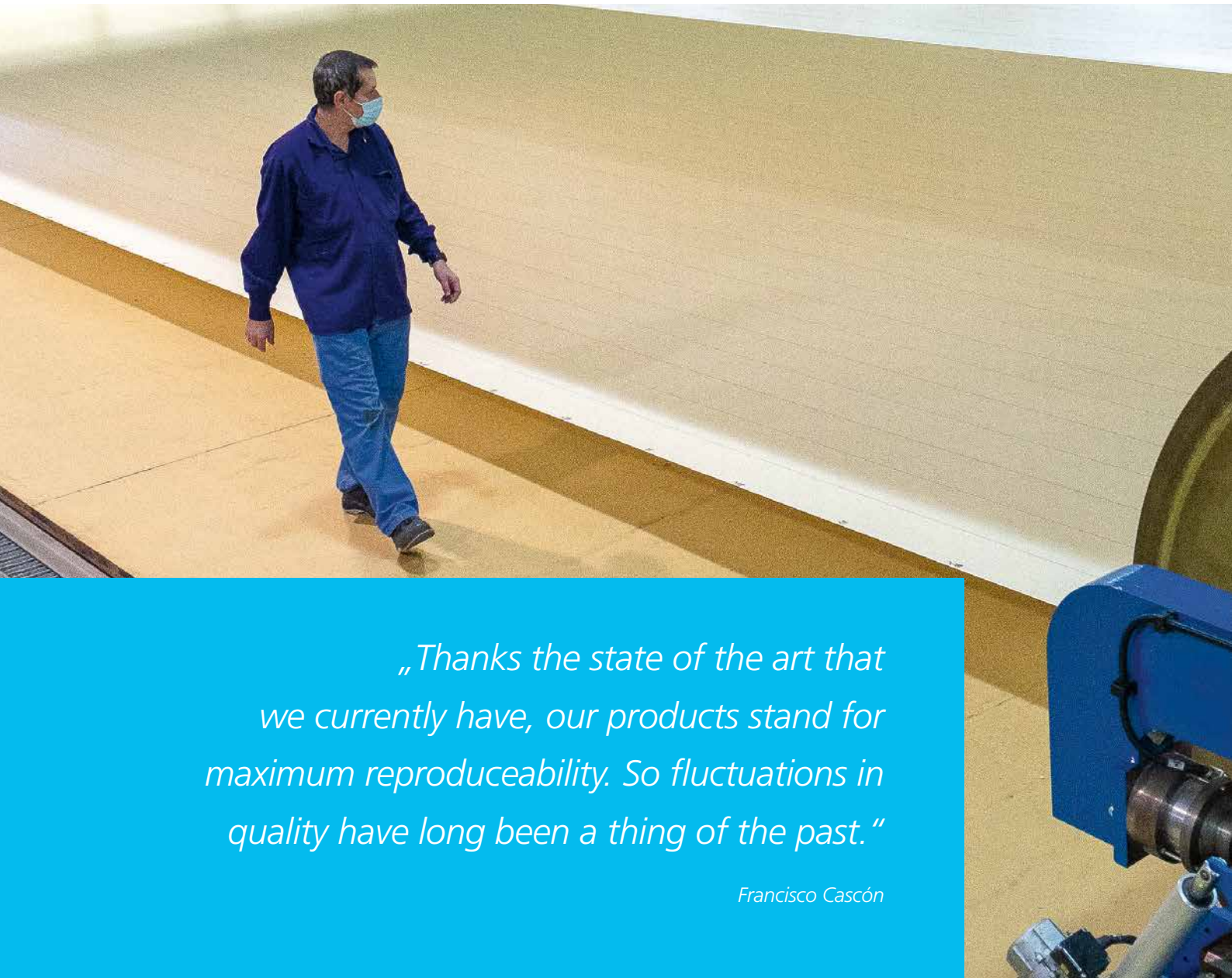
All manufacturing departments - Weaving, heat-setting, seaming as well as development, laboratory and of course the strategic product management as new product properties are presented to them. They are the eyes of the customer in the development process.
The way we operate at Heimbach Ibérica, highly experienced paper technologists and engineers from all areas work closely together right from the start.
We feel that this high level of competence and combination of specialisms is one of our distinguishing factors.

How do you ensure that a new product meets the requirements set for it?

We carry out laboratory tests to check the performance of the cloth. This consists of a variety of analyses. For example carrying resistance, void volume or water absorption, FFI values, elongation values or seam marking and stability. We also have a pilot machine with which we carry out specific control tests.

Keyword innovation cycle: how high is the turnover you achieve with new or optimised dryer fabrics?

About two thirds. Looking at our „New Generation“ Secoplan designs it is as high as 80 per cent.



„Thanks the state of the art that we currently have, our products stand for maximum reproduceability. So fluctuations in quality have long been a thing of the past.“

Francisco Cascón

How can this be explained? Are today's products significantly different to the past?

Significantly different for sure. As already mentioned they are without fail tailor-made. Just remember that the requirements of the paper industry are constantly changing, and therefore so are the expectations of our products. This is especially the case in the dryer section where energy consumption is a constant concern, the contribution of dryer fabrics should never be under-estimated. The fabric design also has a huge influence on running times, contamination behaviour and many key factors such as economic and ecological concerns. If there is one thing that I can promise our customers, it is that we will continue to stay ahead of the game in the future.

1971...

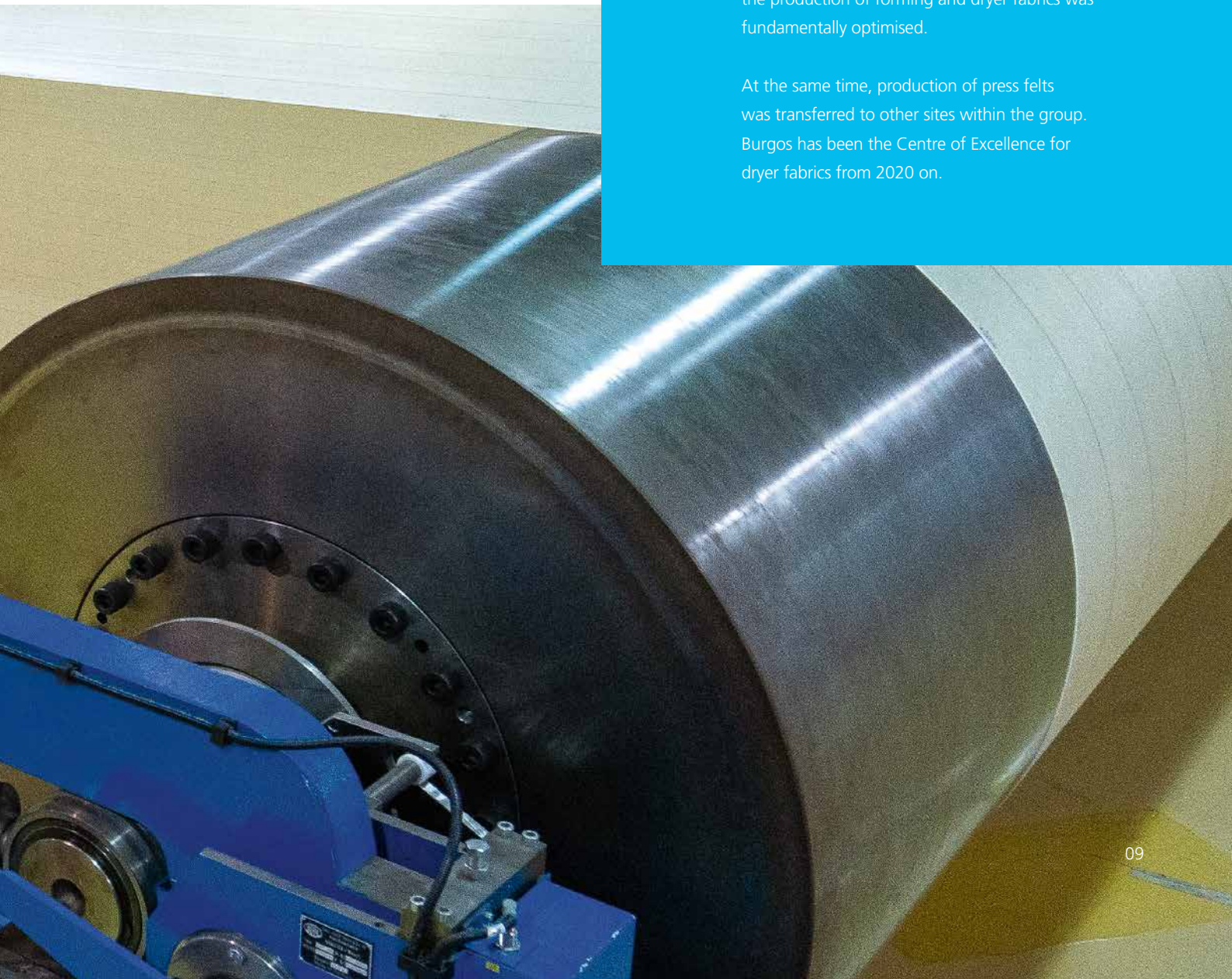
Heimbach Ibérica:

In 1969, the city of Burgos launched its state development pool to promote industry and Heimbach was one of the first participants to seize this opportunity.

In 1971, Heimbach Ibérica was set up as a subsidiary plant and from then on supplied the Spanish, Portuguese and Latin American markets with press felts and dryer fabrics.

Forming fabrics have been produced in Spain since 1980. Between 2006 and 2009 the site underwent an extensive investment programme. All machinery was modernised and the production of forming and dryer fabrics was fundamentally optimised.

At the same time, production of press felts was transferred to other sites within the group. Burgos has been the Centre of Excellence for dryer fabrics from 2020 on.



Welcome to the digital world

Artificial intelligence has also found its way into Heimbach. As early as Summer 2020, impressive gave a detailed update on the first tests with visual error avoidance paths and machine blogs. Since then we have continued to make significant improvements in knowledge exchange between employees and increased the transparency of production. Anomalies and the sources of faults are documented very clearly and the solutions to these problems are worked out within the team. Now is the time to make further improvements to the structure of our digital process and digital training system.

Many areas of our daily lives have been influenced by artificial intelligence for a considerable time already. This influence can be seen in our smartphones, social media feeds and online advertising. We are followed around the clock by clever algorithms. In the paper industry itself, artificial intelligence is becoming increasingly important. The opportunities are everywhere, whether we are talking of process optimisation, relieving employees or cost reduction.

AI in cooperation with the Technical University of Aachen

In today's world, making workplaces attractive and developing process flows are matters of major importance. We do this, among other things, in cooperation with RWTH Aachen University and the newly-founded competence centre, „WIRKsam". This network has been created to carry out research into the extensive possibilities of artificial intelligence for the future world of work and production and to make them usable. Heimbach is one of nine regional companies involved in this.

Visual error prevention paths and machine blogs

How are we able to optimise product quality through visual error prevention paths and machine blogs? How can we contribute to bringing even greater machine efficiencies at our customers? What are the possibilities opened up to us by the Internet of Things?

The aim of these considerations was to introduce systems for root cause analysis and presentation and to anchor, as firmly as possible, the exchange of knowledge between experts on site. We have now been able to make great progress along this path and are currently in the process of transferring the positive results from machine blogs to the finishing department and ultimately to the needling department.

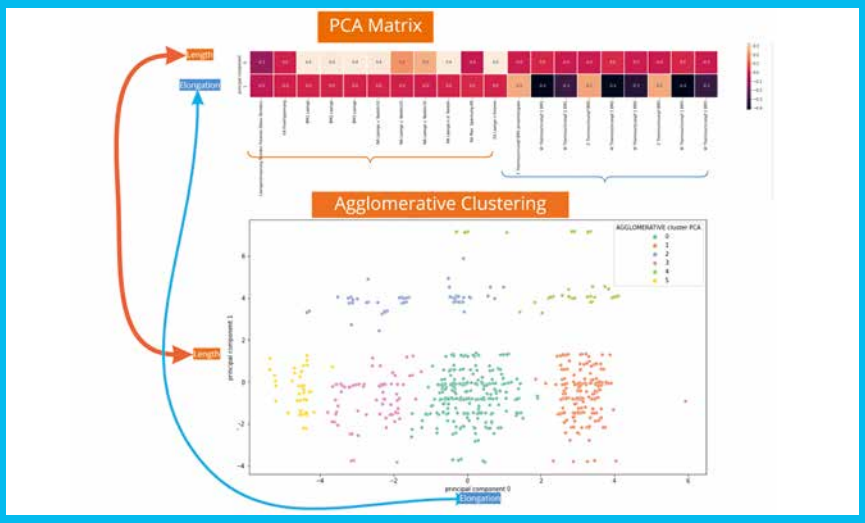
Digitisation of learning and production processes

The Industry 4.0 working group has been meeting regularly for some time now to discuss and document the progress of different projects. With its own „Search engine", or training platform, knowledge exchange within the Heimbach Group has also become faster and better. The prototype of a digital training system has been tested and evaluated by 45 employees.

Learning modules on the topics of occupational safety, hazardous substances, energy, paper machine clothing and corresponding explanatory videos were rated positively across the board: Good user-friendliness, high flexibility and instructive content.
In addition, the attractive look and appealing user interface have significantly increased the joy of learning. Based on this, we are continuing to expand our infrastructure for digital training.

Arash Rezaey, Technical Textile Institute of the University of Aachen

„In our cooperation with Heimbach, we have been able to identify and continuously implement the relevant applications in manageable steps.“



The principal component analysis (PCA) shows coloured clusters with similar properties

Wolfgang Müller checks the recorded operating data for correctness

„Through visualisation we have been able to better recognise correlations and interpret them accordingly. Following the motto „Learn from your mistakes."

Wolfgang Müller, Foreman Base Fabric Manufacturing

The first training tools for the areas of occupational safety and IT security were already implemented at the end of last year. The programmes are automatically aligned with respective requirement profiles and can guarantee targetted learning. In turn, this means that the know-how imparted can be much more precisely adapted to specific needs within the company - and at the same time to those of our customers. And all of this within a much shorter time frame.

Transferred into production this means: we can learn even better from our data, can recognise correlations much more clearly and can also make more precise predictions. Errors and the causes thereof, which were not able to be fathomed directly previously, can now be analysed.

Only 20 influencing variables instead of 350

In the course of our production processes, we have to take into account around 350 influencing variables. How do changes in length and width affect our press felts? How are we to evaluate the wear processes? What statements can be made regarding reproducibility, efficiency and strength?

Evaluating this, and having the capability to reliably predict it is an extremely time-consuming task. That is without taking into account identifying individual outliers in the labyrinth of measurement profiles, curves and statistics. Our objective is to reduce this huge flood of data to just 20 variables with the help of AI.

It is about much more than streamlined data, however. It is equally important to bring the expertise of our employees into a digital format: to visualise the results within the framework of a team, discuss them and expand knowledge. Put into one sentence, we are striving for faster problem solving by means of shorter paths and more active participation within a digital learning environment and structured processes.

At Heimbach, the benefits of AI extend far beyond laboratories and factory halls. With the new, more intelligent form of troubleshooting we are able to evaluate the data provided in a more targetted way and at the same time react more quickly to different requirements and difficulties.

Do you have any questions regarding digital learning/artificial intelligence or are you interested in sharing experiences?

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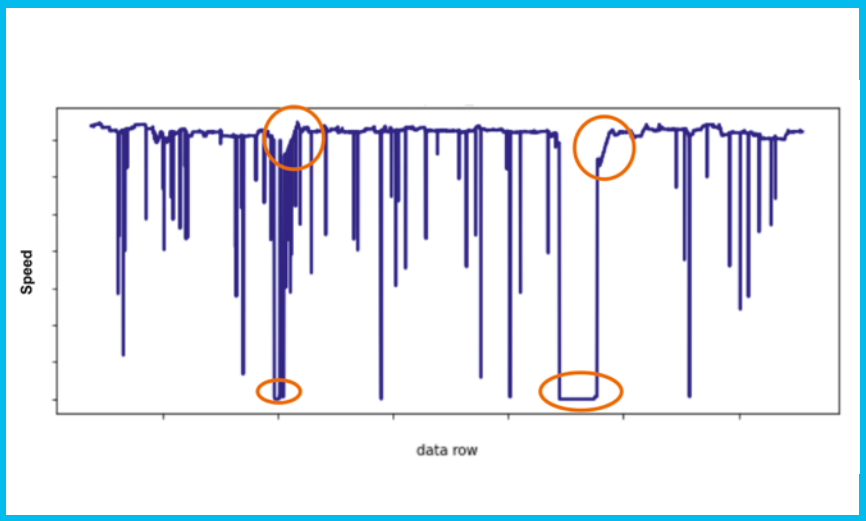
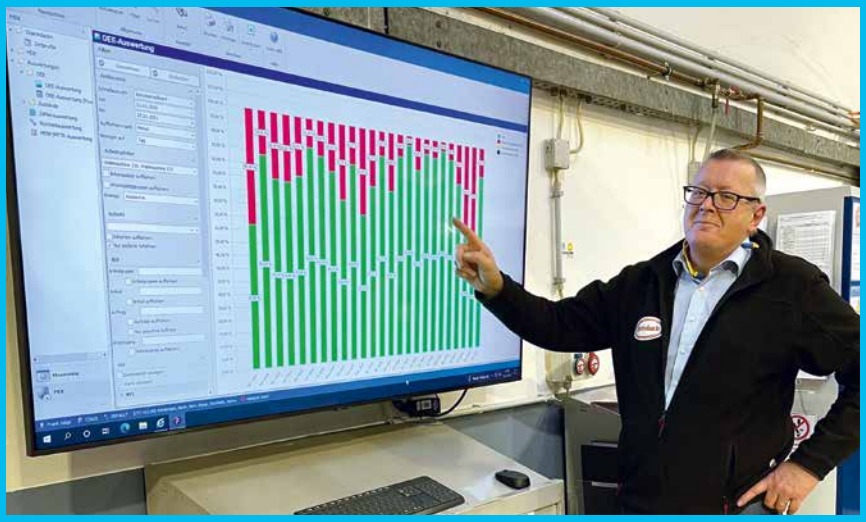


Significant instances of machine downtime and start-up behaviour



Frank Salge always has an eye on the machine utilisation rates

„We want to gain even more insight from our machine data to increase customer satisfaction and improve troubleshooting.“

Frank Salge, Base Fabric Manufacturing Manager

„Qualification levels will continue to rise“

impressive speaks with Thomas Friedewald – Head of Paper Technology

What about the next generation entering into the paper industry? What influence is digitalisation having on training? What does the school expect from the industry? impressive spoke with Thomas Friedewald on this as well as other exciting aspects to consider for papermakers of tomorrow. He is Head of the Paper Technology Department at the Johann Friedrich Pierer School in Altenburg.

Mr Friedewald, it’s nice of you to take the time to answer our questions. Do you think your department will still have enough students in ten years time?

I assume you are talking about the declining numbers of applicants applying for an apprenticeship as a paper technologist.

Exactly. According to the latest apprenticeship survey commissioned by the Association of Bavarian Paper Mills it is likely that only around 81% of available apprenticeship places could be filled in 2020. Should the industry start to worry?

Well, the industrial-technical professions are all having more or less difficulties when it comes to the recruitment of young people. The ratio of young people to apprenticeship positions on offer is currently around 1 to 1.1. At the moment enough are coming. But basically we have to consider how we can make sure that the different positions in the paper industry inspire young people to join us. This is all the more important since more than half of school leavers today prefer to join a course of study rather than take up an apprenticeship. The number of potential apprentices is not only declining in our industry, but in general as well.

What is the current situation with you?

In the paper technology department we have had between 260 and 290 students per year over the last 10 years. The number of trainees for paper technology is relatively stable at 35 to 40 per year. In the case of our two year training programme for machine and plant operators in the field of print finishing and paper processing, which we have been offering since 2015, we have been able to increase numbers fivefold, from 8 at the beginning up to 38 at present. Interest in packaging technology, on the other hand, is declining sharply. So from this we can say: the enrolment figures at our vocational school are very much dependent on the training subject and occupation. Also, that despite the huge shortages in skilled workers the number of applicants is not always enough to satisfy companies.

PVZ Centre Altenburg

What do you think can be done better in order to get young people interested in joining the paper industry?

I believe, above all, that the strengths of the industry must be brought even more sharply into focus, especially among young people. Sustainability, environmental awareness, digitalisation, innovation – all these are linked inextricably to the paper industry. Paper technologists are also ranked in the top third of apprenticeship professions in terms of pay – another argument for potential applicants. As great as the competition for young talent has become, our industry is certainly able to score points with various factors.

What are you looking for from the paper industry? And what tips can you offer from your own experience in recruiting young talent?

Of course, I would like to see sufficient applications every year for the profession of paper technologist. That is, after all, what our school is for. Unfortunately, we cannot influence that. Based on our daily experience here in Altenburg, my concrete suggestion for the industry would be: take time for more personal contact with future apprentices. A traineeship is the perfect opportunity for students and companies to get to know each other. That's why, in my opinion, broadly distributed recruitment campaigns make little sense. I firmly believe that intensive contact with a few potential applicants in the region is a more promising approach.

Every fourth person drops out of education. Is that also an issue for you?

Fortunately not. We rarely have dropouts among our paper technologists. This is certainly due in part to the fact that we maintain very close contact with our trainers in Altenburg. This inter-connection means that any problems or discrepancies that may arise can be quickly resolved. The take-up rate once training is complete is

Wet laboratory

PC room for the simulation programme

„Altenburg graduates are extremely well-trained specialists and have always been valued and in-demand."

Thomas Friedewald

almost 100 per cent. Of course, that is always an important factor for young people.

Has the timetable changed over the years – bearing in mind the background of digitalisation?

The timetable is based on a nationally standardised curriculum, which cannot be easily changed. However, our curriculum is designed in such a way that the teaching staff can react to changes or new technology at any time. Since the last re-design of the curriculum the learning field orientation brings individual subjects such as chemistry, physics, mechanics, raw material science, measurement and control technology, process engineering or environmental management into a meaningful technological unit. In this way, we also introduce our students to the depths of process control systems. This is applied digitalisation. You can certainly see that the topic of re-format so that it shows Industry 4.0 is also gaining ground within our organisation. In this way the level of qualification for paper technologists will continue to rise. I find that extremely exciting.

What support do you get from Heimbach in this?

Close cooperation with the industry is important to us. In particular relative to high-tech production process like paper manufacturing, it is vital to get to know every facet of the supply chain as early and as practically as possible. On the subject of paper machine clothing, therefore, our school has been in close contact with Heimbach for many years. In the third year of every apprenticeship, there is a training block with a lecturer from Heimbach. In addition we visit the clothing expert for a two day excursion every two to three years. The partnership with Heimbach certainly has many advantages for both parties.

Your school has a long tradition. Altenburg has been providing training and further education for the paper industry since 1905. What are the important milestones?

Altenburg graduates are extremely well-trained specialists and have always been valued and in-demand. Over the last 30 years we have continuously expanded our training programme and have developed into a stable and reliable partner for the paper industry. We also founded our support association, P2V-Zentrum Altenburg e.V, in 1993. Since then we have managed to gain over 60 members, which includes more than 40 companies from relevant branches of industry. With the help of this powerful association we have been able to maintain training and further education at the highest level.

Hall of Residence

Berufliches Schulzentrum Altenburg

The **Johann Friedrich Pierer School** in Altenburg, Thuringia, is one of two nationwide training centres in Germany providing dual vocational training for the paper producing industry.

Vocational training for the paper processing and packaging industry forms the second pillar of the department.

The school offers a further possibility to obtain a degree as a state-certified technician with a focus on paper processing technology by means of a four year part time technical college course.

The tradition of training in Altenburg began over a hundred years ago in 1905. There are currently more than 270 students sat at their desks preparing themselves, practically and theoretically, for their entry and subsequent advancement in the paper industry.

www.pierer-schule.de

Our next edition of impressive will include an interview with Gernsbach Paper School

„We know that Heimbach clothing never lets us down and is able to meet all of our expectations.“

impressive meets with Rudi Peters – Production Manager PM 5 DJP De Hoop

De Hoop has been a part of De Jong Packaging since October 2021. Has anything changed since then?

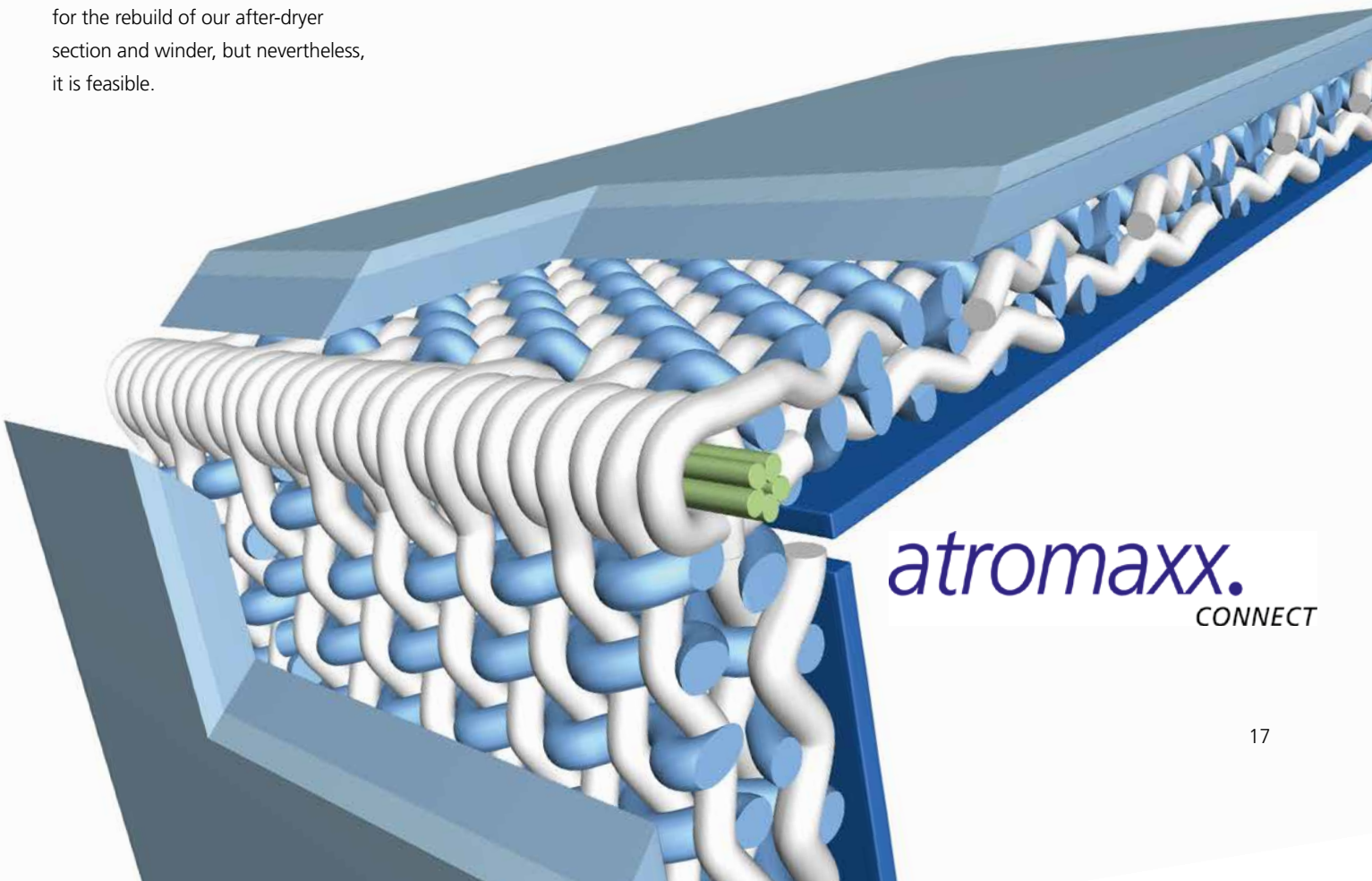
No, not really, it's been more or less business as usual. We produce for De Jong, but we also have a delivery obligation to DS Smith. We also supply our own customers with gypsum board, for example.

Will last years production record be a one-off?

We achieved record results on both machines – and that with a lower basis weight. That makes us somewhat proud and also serves as a motivation for us. So we are quite optimistic that we can repeat this success. It will be a big ask, as we have planned a week-long downtime for the rebuild of our after-dryer section and winder, but nevertheless, it is feasible.

What do you expect from your clothing suppliers?

Problem-free cooperation in a spirit of partnership. If we find ourselves in need of help, a flexible contact person must be available at all times. And of course, we need totally reliable clothing. In addition to obtaining the longest possible lifetimes, energy costs must also come down. We made our first trial with Atromaxx.Connect in May last year, and the result was more than convincing. So much so that we rely 100% on Heimbach for press felts, and organise our stock levels accordingly.



You have worked for many years with Heimbach. What are the reasons behind this?

We know that Heimbach clothing never lets us down and is able to meet all of our expectations. The forming fabrics run trouble-free, the felts give us the highest level of dewatering. Because of the „self-cleaning" effects of the felts, we didn't need any chemicals for the 1st bottom felt and were able to save four-digit sums every day as a result of this. That is in addition to the improved energy balance that we have, compared to competitor products. And last but not least is the finely-tuned service package, with which we are completely satisfied.

What will be the biggest challenges in the future?

Fortunately, we have full order books at the moment. All the more reason, therefore, to focus with greater clarity on cost savings and increased productivity.

Unfortunately, we have no influence on energy prices but with the latest set of clothing we were able to significantly reduce steam consumption. Although in the past we placed the greatest emphasis on long running times, today it is often the dry content that makes the difference.

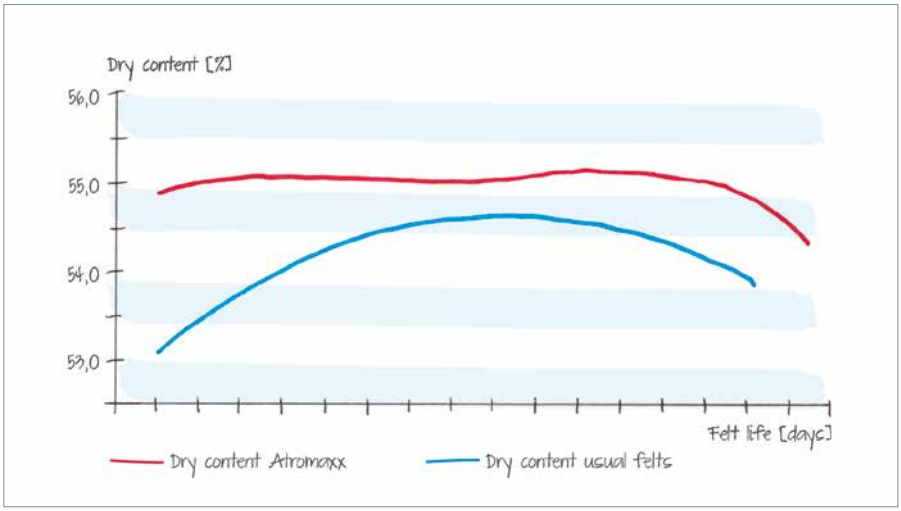
DJP-DE HOOP
PAPER MILL

- Founded in 1657, part of the De Jong Packaging group since 2021
- Approx. 185 employees
- Production capacity around 380,000 t/year
- 100 – 200 g/m² Testliner from re-cycled papers
- Sustainable water management: Most of the water is purified and recycled into the production process.
- The resulting Biogas is used in the company's own power plant.

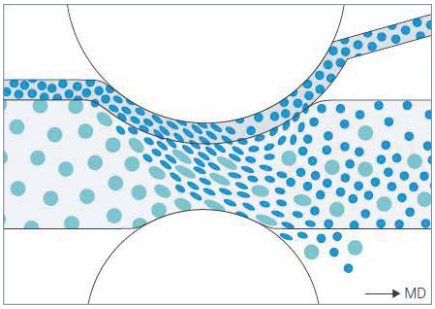
PM 5

More benefits through maximum nip-dewatering

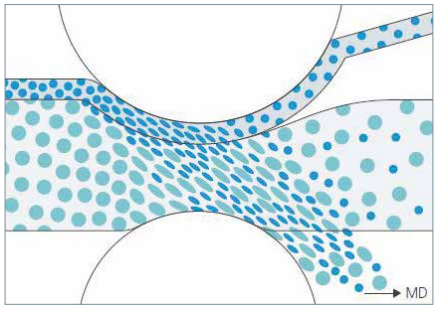
- + Higher dryness after the press
- + Improved profiles and runnability
- + Reduced felt cleaning agents due to „self-cleaning" effect
- + Energy savings from turning off Uhle boxes
- + Longer running times
- + Reduced consumption of sealing water in vacuum pumps



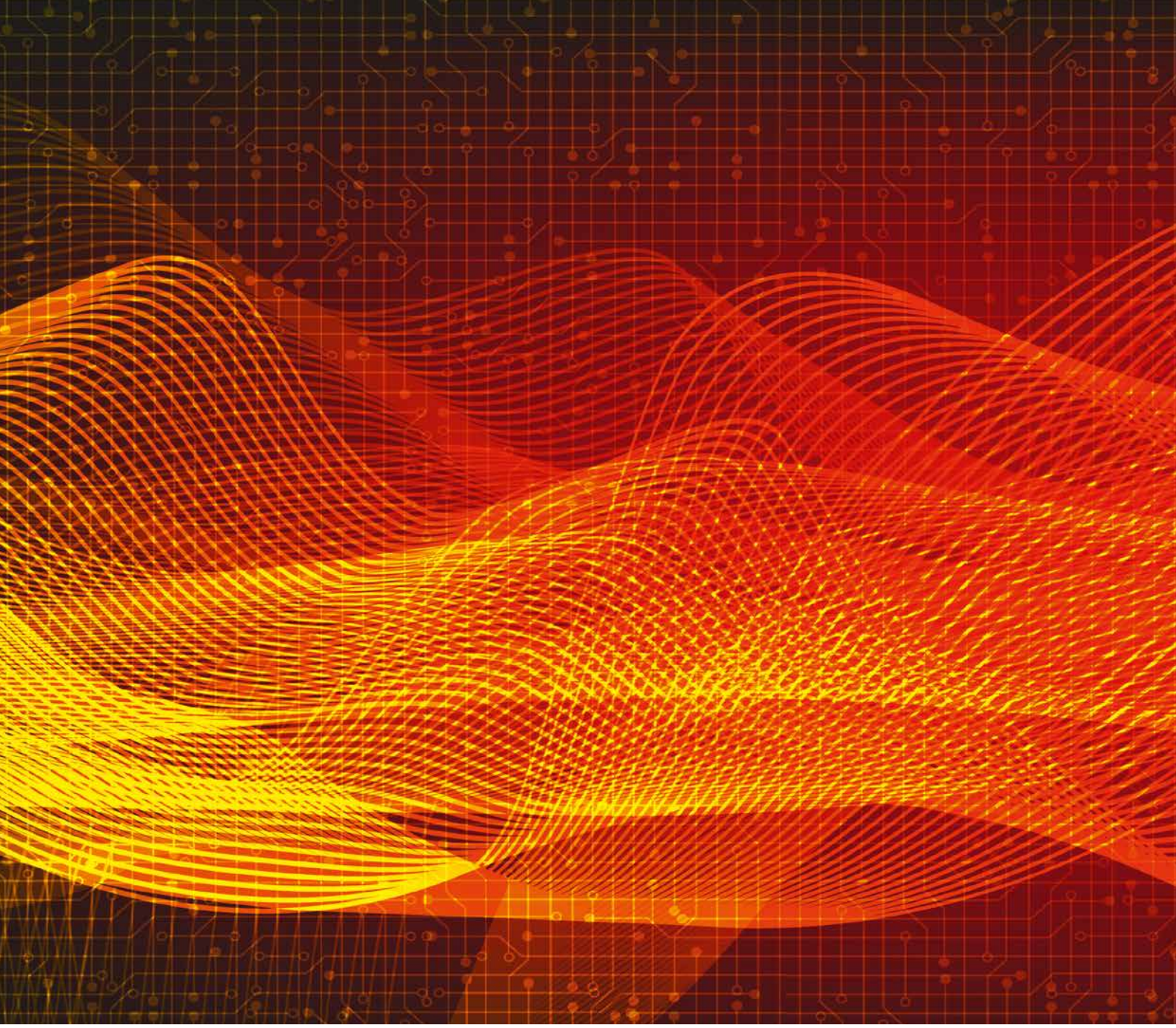
Comparison of dry content after the 3rd press (shoe press)



When a felt is too dry (insufficient saturation) the full potential of nip dewatering can not be reached



How it should be – optimal saturation, best nip-dewatering



Forming section audit Part 3

Forming section efficiency on the paper machine is something that should be checked at regular intervals, using a variety of methods. In addition to set production targets, the principal focus is on energy, machine availability and monitoring of the forming fabrics.

One method to accomplish the latter is our new online photo-diagnosis (Fig. 1) procedure, which allows forming fabric condition to be precisely checked while the machine is running. This means that when a shutdown is being planned a safe decision can be made regarding whether the fabric should be changed.

In part 1 of our „Forming Section Audit“ series, we already reported on analyses of conditioning equipment.
In part 2 we showed how to identify and correct deviations of the real wire or jet speed from the values shown in the PCS system in order to improve formation, fibre orientation and paper strength in the machine or cross-direction.
In this article you will learn how to determine the causes of barring using the ODIN measurement method in conjunction with an FFT vibration analysis.

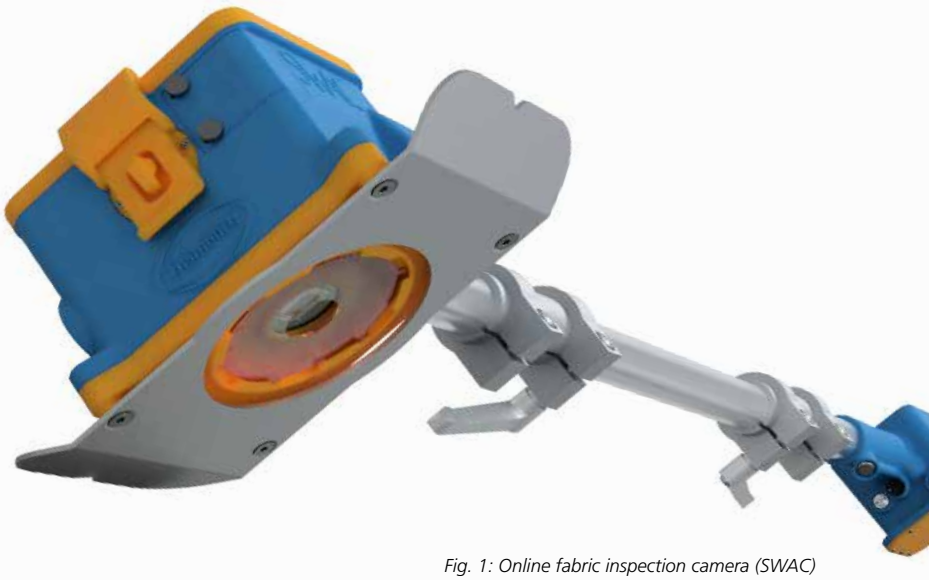


Fig. 1: Online fabric inspection camera (SWAC)

Barring

Periodic mass variations in the machine direction, also known as barring, often have an impact on paper quality. In some cases, barring is transported through the paper web along the entire machine and only leads to acute problems at the end of the paper machine and during further processing. One typical consequence of this is, for example, greatly reduced running times of calendar rolls leading to adversely affected production and downtime planning.
The cause often goes back to the forming section. Our TASK department can locate the exact cause of the fault by using the mobile ODIN measuring system. Furthermore, used in combination with vibration measurements, upstream disturbance factors in the stock approach flow system of the machine can be detected.

Fig. 2: ODIN measuring equipment

„Our TASK department can locate the exact cause of the fault by using the mobile ODIN measuring system." *(Fig. 3)*

ODIN measurement priciples

While the machine is running, an infra-red light beam is sent through the paper web via the lens system of a measuring fork. The signal subsequently received with the aid of an optical sensor is proportional to the longitudinal fluctuations occurring in the paper mass in the area of measurement. Fluctuations in a range of 0,3 to 1,5 kHz can be detected.

Deviations from the average paper mass that are recurring regularly in the machine direction are displayed over the frequency range. These frequencies can then be traced back to the originator (Fig. 2).

Fig. 3: Using the ODIN measuring fork in the forming section

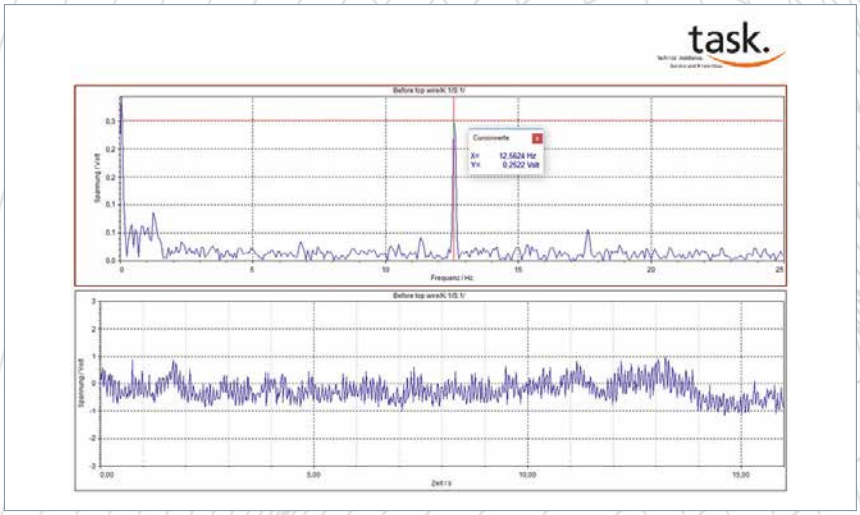


Fig. 4: FFT results in the forming section

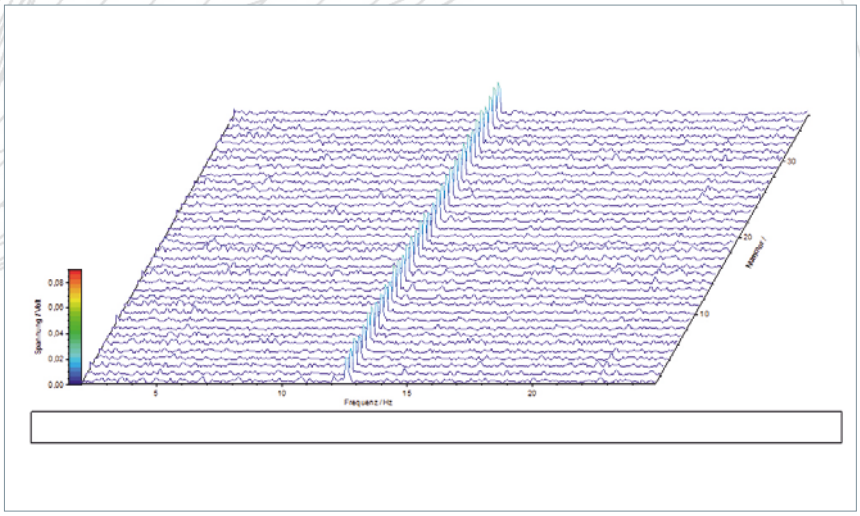


Fig. 5: Waterfall diagram: constant barring frequency with change in fabric tension

Practical procedure

The first measurement must be taken in the finished paper (prior to the reel). Measurements are then taken step by step going against the run direction of the machine back towards the headbox. If barring frequencies no longer occur during this procedure their cause must be located between the last and the previous measuring position. The last possible measuring position for ODIN equipment is just behind the forming table. If barring frequencies are still present there the cause will be found in the stock approach flow system or the periphery of the machine with alternative measuring methods and equipment.

The simplest method is to compare rotation frequencies of potential causes with the barring frequencies found in the paper. This can be determined quite easily using a speed measurement device. If this does not lead to a result Heimbach TASK group can offer a vibration analysis in the stock approach system and/or on the paper machine.

Practical example

A fourdrinier machine with a secondary top headbox for the production of packaging papers showed a high break frequency as well as strong vibrations in the wet end. During a routine measurement of the felt water content a barring frequency of 12,56 Hz was determined in the second top felt using an FFT analysis. This frequency was also detected with the ODIN measurement equipment both before the reel and in the fourdrinier section (Fig. 3 und 4).

A comprehensive audit at constant production speed was able to provide information regarding the exact cause. A drainage analysis was carried out, the wire speed and roll rotation frequencies were measured, and the jet speed was confirmed by laser (see also impressive 3_2021).

The subsequent ODIN measurment showed mass variations up to the wire section. In order to further narrow down the location of the cause, various machine parameters were modified:

- When forming fabric tension was increased, the barring frequency remained constant – an indication that fabric resonance was not the cause here (Fig. 5).
- When machine speed was slightly reduced, the barring frequency dropped to 12,31 HZ, in proportion to the speed reduction.

Subsequently, with the speed constantly lower, the speed of the headbox pump was increased back to the original level. The barring frequency remained at a level of 12,31 Hz. From this result, it was clear that the trigger was not to be found in the approach flow system, but in the wet end of the machine.

The subsequent vibration measurment was focussed on the press rolls. Acceleration sensors were mounted on the front and back sides and the rolls were fitted with a speed trigger to determine the harmonic components of the vibration spectrum (Fig. 6).

The disturbing barring frequency of 12,56 Hz was found again with a relatively high average vibration speed of 3,00 mm/s on the front side at the top roll of the 2nd press (Fig. 7 and 8).

Result

The vibration measured on the frame of the fourdrinier section confirmed the transmission of the barring frequency from the press section into the forming section.

According to DIN ISO 10816 the measured values made it possible to assess which of the rotating components (in this case press rolls, drive shaft or gearboxes) were running at an acceptable vibration level or where there was a need for urgent service (Fig. 9).

The cause of the problem was therefore the deflection compensating roll of the second press. After this was changed at our recommendation the barring was eliminated and the uptime of the machine was greatly improved.

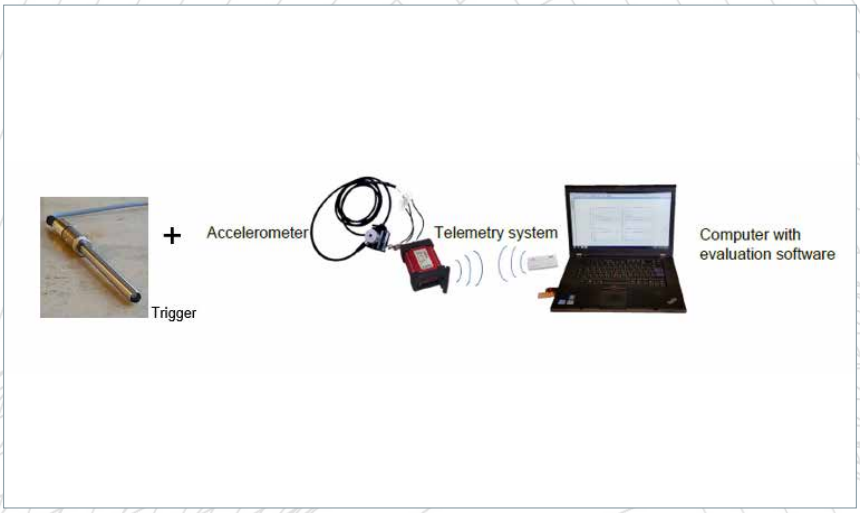


Fig. 6: Equipment for vibration measurements

Fig. 7: Vibration sensor position top roll 2. press

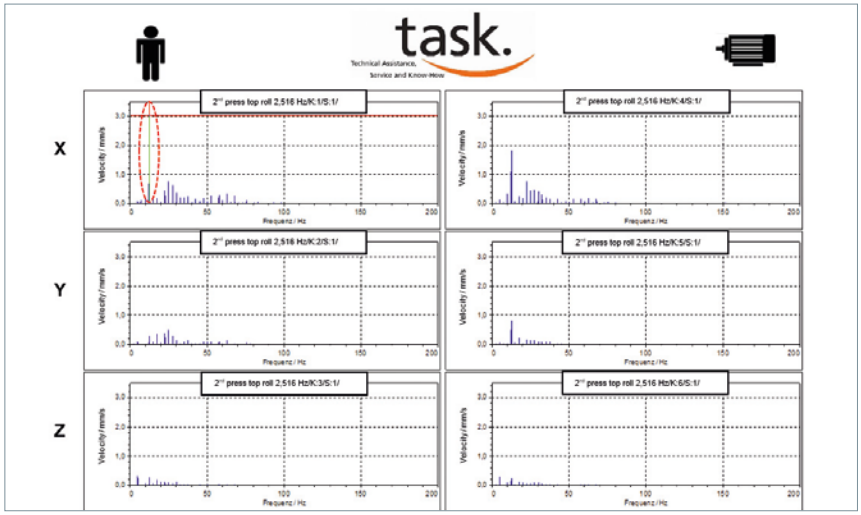


Fig. 8: Vibration speed FS bearing, 2nd press top roll: 3 mm/s in X direction (run direction)

Do you have questions regarding this article or our service offering?

Michael Loenißen
Phone +49 (0) 2421 802 463
michael.loenissen@heimbach.com

„The vibration measured on the frame of the fourdrinier section confirmed the transmission of the barring frequency from the press section into the forming section."

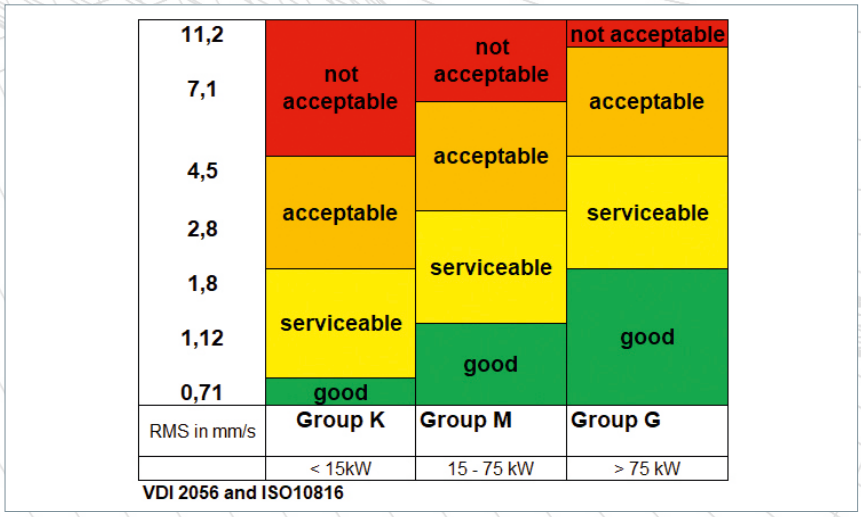


Fig. 9: Chart ISO 10816

In profile

At Heimbach, many paths converge and employees in Europe and Asia work hand in hand. As representatives of our international team we are happy to introduce four more committed Heimbach colleagues to you today.

Ted Xia

Manufacturing Manager
Heimbach Suzhou

At Heimbach since 2016

„Don't put off till tomorrow what you can still do today."

Field of activity
forming fabrics, press felts, dryer fabrics
By background
Mechanical engineer
Milestones
Start-up of ‚Pressing 2.0' project and achievement of the production target
In private
Ted is not only communicative, but also very sporty. At least twice a week he hikes in the mountains and refreshes body and mind.

Francisco Cascón

Technical Manager Dryer fabrics,
Heimbach Ibérica

At Heimbach since 1980

„The important thing is not to stop questioning."

Field of activity
Competence centre dryer fabrics
By background
Textile engineer
Milestones
Realisation of new designs, most recently with Secoplan. Taking the project from the idea stage to commissioning of production through to the worldwide market launch.
In private
Francisco recharges his batteries on his many journeys through Europe. Relaxation from everyday life by reading or meeting or meeting with friends.

Sara Wyss

Head of Seam Processing/Final Inspection/ Packing Departments at Heimbach Switzerland

Rejoined Heimbach in 2006, having previously worked there from 1995-98. Apprenticeship as textile technologist at Heimbach.

„We cannot predict the future but we can shape it."

Field of activity

Staff management and process optimisation in the seaming department, packing and final inspection.

By background

Textile technician TS with several years working experience in the textile industry

Milestones

Responsibility taken for the above departments with 16 employees. Introduction and implementation of Lean and shop floor management.

In private

Sara enjoys spending time with her family - whether it's hiking, cycling or enjoying a tennis match. She is also interested in faraway countries and other cultures.

Lukas Wieczorek

Technical Service TASK Heimbach Düren

At Heimbach since 2021

„Where there is a will, there is a way."

Field of activity

Customer-oriented services, Process optimisation

By background

Trained paper technologist, many years of professional experience in the paper industry. Additional training: State-certified technician for mechanical engineering

Claim

Expanding experience within the paper industry

In private

Lukas is a passionate football supporter and supports the youth team of his two sons. Weekends on the sports field are the perfect balance to his work.

Heimbach-TASK

Process expertise and tailored solutions

Even small improvements in and around the paper machine can often release great savings potential. Your profitability can be enhanced by maximising production efficiency and keeping maintenance costs to a minimum. Place your trust in our technical know-how and sound service competence that provide effective support in optimising your processes.

See for yourself our well-established expertise and extensive technical service portfolio, including:

- Nip Profile Measurement
- Speed Measurement
- Thermography Measurement
- Troubleshooting

task.
Technical Assistance,
Service and Know-how

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