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PHOTO CREDIT: CITY OF DÜREN

» Düren is proud of its industrial companies. «

The Schoellershammer paper factory is one of the most tradition-rich, family-owned companies in Düren. They have successfully managed to adapt to changes in the German, European, and, global markets for centuries. That ability to adapt stands as a testament to their entrepreneurial courage, commercial skill, creativity and innovative technical developments.

This paper mill was founded in 1784 – that is even before the French Revolution – with the conversion of a hydropower-operated hammer mill. In the course of its rapid development, the company became renowned far beyond the borders of historic Prussia. One of the company's many highlights included the presence of Heinrich August Schoeller Söhne at the Paris World Exposition in 1867 to accept an award. The explanation was as follows: „This factory is characterized by the excellent execution of their many product variants. It has managed to fully maintain its outstanding reputation, which it garnered several years ago. In full recognition of the manufactured paper, it was awarded the gold medal".

Today, Schoellershammer produces containerboard only and manages to prevail in the market by staying flexible and customer-oriented in a commodity market characterized by high-tech and efficiency. The decision to invest in a new paper machine proves the high entrepreneurial commitment of the owner family to the benefit of the company and the region.

The city of Düren is proud of its industrial companies, amongst which the paper producers and paper processors have been the most significant players from the start. We are a paper city. Inherently, this entails a responsibility on behalf of the municipal administration and policy to support the further development of our companies in Düren. This has been achieved thanks to excellent cooperation. I would like to thank the shareholders and company management for the large investment in the new paper machine at Schoellershammer, which secures jobs. Generations of employees from the city and the region have worked and continue to work at the Schoellershammer paper factory, which provides them and their families with a livelihood. Together, the management and workforce create considerable added value and thus make an important contribution to ensuring that Düren remains a lively industrial city in the future.

I would like to express my personal thanks to Heinrich August Schoeller, who became managing director in 1945 and still holds an important position both in the company and the social realm. He has decisively impacted the work of the paper and industry associations on a regional scale and far beyond. Düren owes him a lot, also as a long-standing chairman of the Förderverein des Papiermuseums.

My heartfelt congratulations on commissioning the new paper machine at the Schoellershammer plant. I wish God's blessings, economic success, and that you continue to enjoy making paper!

Paul Larue,
Mayor of the City of Düren

IMAGE SOURCE: CITY OF DÜREN

03 The mayor of Düren, Germany

IMAGE SOURCE: APR

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IMAGE SOURCE: EICHHORN

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PHOTO CREDIT: SCHOELLERSHAMMER

» Schoellershammer makes a strong statement. «

The coat of arms of the district of Düren shows what our area is all about. At the top we have the lion, who is expelling the once mighty dukes of Julich. And at the bottom is a black „D" on a white background, which represents a sheet of paper. This element pays tribute to the paper industry, which has shaped the Düren region for centuries and will continue to do so in the future.

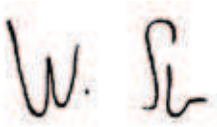
The Schoellershammer paper factory has recently sent out an important message that affirms this future. At its headquarters in Düren, the company has invested 100 million euros in the construction of the new paper machine 6. This means that the medium-sized company with a history of more than 230 years will now be able to more than double its annual production of containerboard. And waste paper is completely recycled, which means that the materials cycle is completed in an exemplary fashion.

The imposing new building, which is 225 m long and 22 m high, represents Schoellershammer's confidence in the long-term positive development of the packaging industry and the Düren district. Increasing online sales have significantly spurred the demand for packaging materials. Schoellershammer has recognized this opportunity and took a courageous step.

I would like to take this opportunity to thank the decision-makers at the company for their loyalty to the region, from which the city and district of Düren will benefit in many ways. New jobs have been created, and 33 new employees are on board. This means that the independent company is employing almost 250 people in Düren, 95 percent of whom live in the district of Düren with their families or partners, who enrich and strengthen the district. The business and income tax yields additional resources for our community, which we use to render many services to our citizens.

The capable paper industry is rightly part of our coat of arms. We proudly tell outsiders the story of the original „Bonner" Basic Law, which was printed on handmade paper from the district of Düren. For our current location marketing, the reference to the large investment made by tradition-rich Schoellershammer is very valuable. The message to the world economy is: Take a closer look, the district of Düren is conveniently located in the heart of Europe, has very skilled citizens, is rural and thus offers many advantages while leaving nothing to be desired in terms of quality of life.

Everyone likes a success story. I am delighted that Schoellershammer's success story has come true with the support of the district of Düren, and I wish all employees of the company success and enjoyment in their work!



Wolfgang Spelthahn,
district administrator of Düren

Aerial view of Schoellershammer

PHOTO CREDIT: SCHOELLERSHAMMER

INTERVIEW

"AN INVESTMENT IN THE FUTURE FOR THE COMPANY AND THE WORKFORCE"

After successfully commissioning the new containerboard machine, apr interviewed the managing directors of Schoellershammer – Bernd Scholbrock, Alexander Stern, and Armin Vetter.

apr: Schoellershammer is one of the few family-owned companies in the German paper-making industry. Please briefly tell our readers how the company has developed over the last 30 years.
Bernd Scholbrock: 30 years ago, the business model of Schoellershammer was essentially based on graphic fine papers. In those times, sales and earnings were defined by the „white page", as we used to call it. But the demise of the transparency paper had already begun. Technical drawing and blueprinting was gradually being replaced by CAD and plotter technology. Graphical applications in the advertising industry did not suffice to make up for this quantitative loss. Schoellershammer began to increase its containerboard productivity by modernizing the PM5. In 1992, a shoe press, the third in Europe at the time, was installed. In 2000, the Fourdrinier wire was replaced by a GAP former. The first fully automatic warehouse with vacuum lifter was put into operation in 2003. In 2005, the drive was replaced and increased to 1100 m/min. In 2012, the glue press was replaced with a SpraySizer, the first in Europe and only the second unit worldwide, and the drive and controller of the winder were replaced. This turned the PM5 into a state of the art machine. Further increases in productivity were only possible by focusing on high grammages. So it became clear that Schoellershammer would not evolve any further without a new paper machine. We started planning the PM6 in 2011 by requesting a zoning change. Technical planning followed in the summer of 2014, and the decision to construct the PM6 as well as the decommissioning of all fine paper activities in two stages was taken. Thankfully, by restructuring the fine paper division it was possible to transfer most personnel to the new production unit. So the course was set.

apr: You are now producing containerboard with two paper machines at the Düren site. What were the main reasons for building a new containerboard machine?
Bernd Scholbrock: The market for packaging paper is a slow, but steady race. The economy of scale defines who will survive in the market and who will not. Critical mass for a site develops progressively to a production capacity of over 350,000 tons per year. Moreover, the number of corru-

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The DuoFormer

PHOTO CREDIT: SCHOELLERSHAMMER

gators with a width of 2.80 m has significantly increased. The new plant with a width of 5.6 m is intended to keep up with these developments. Furthermore, it should be capable of producing the increasingly popular low grammages of 80 to 100 g/m² without any productivity slumps. While doing so, it is important to establish an overlap between the PM5 and the PM6, so as to evenly and fully utilize the two capacities as communicating pipes.

Complete production line, including automation

apr: What were the main reasons for choosing Voith as the supplier of the machine?
Armin Vetter: Voith is one of the worldwide leaders in paper machine construction, highly respected, and capable of covering all technological aspects of such a project. With Voith Paper, we have chosen a system supplier who can provide the complete production line from the slat conveyor to the reel sheeter, including measurement technology, automation, and air technology. Moreover, Voith Paper has developed a plant concept with us that meets our goal of establishing a reference plant for very low energy consumption in the production of containerboard. There aren't many candidates who bring along these skill sets. Just enough companies to be able to negotiate reasonably. The goal was to minimize any technical risks that may impact a successful start-up in order to adhere to our ambitious business plan without going over budget.

apr: Please name a few technical highlights of the machine.
Armin Vetter: The PM6 is designed to be a paper machine comprising proven components. The highlights are the MasterJet Pro headbox with a flexible lamella for separation with a very large operating window, the proven 3-nip press and the EcoChange W for tambour changeovers with very few reject parts at the tambour end.

apr: Mr. Vetter, you mention the very large operating window of the MasterJet Pro headbox. In a few words, can you elaborate on the headbox and what exactly this large operating window means?
Armin Vetter: The headbox enables controlling the jet/sieve ratio, i.e., the speed of the material jet to the Fourdrinier wire, which has an immediate impact on the paper. The fiber orientation changes very quickly. This allows us to achieve an even orientation of the fibers and adjust the strength of the containerboard, i.e., longitudinal orientation, transverse orientation, or an even distribution of the fibers.

apr: So you do not always aim for maximum strength?
Armin Vetter: There are different strength requirements for testliner and corrugated materials, and the different types are produced with different jet-wire ratios.

apr: You mention testliner and the varieties Twinhammer, Hammerflute, and Hammerliner. Can you tell us more about your varieties and your naming convention?
Bernd Scholbrock: Traditionally, Schoellershammer has produced new corrugated boards and testliners, whereby testliner was limited to Testliner 3. As part of our development for the new PM6, we intended to drive high grammages on the PM5. For this purpose, we have introduced new varieties. For example, the Hammerflute and Hammerliner. These are our brand names for the high-performance types, which are now in higher demand, especially in light of the scarcity of kraftliner. We have launched these new varieties in the summer of last year and have had a lot of success with them. The same is true for our Twinhammer, which is used specifically in the English market as a corrugator and testliner. This allows customers to optimize their working capital due to the joint stocking of this dual-use variety.

apr: In January you already produced 10,000 tons. Can you elaborate on the range of types?
Armin Vetter: Quite unexpectedly, we had already produced the entire product spectrum and range of varieties in January. Meaning not only corrugating material, but

The SpeedSizer

PHOTO CREDIT: SCHOELLERSHAMMER

also testliner and 80 g corrugator, testliner 90 g and both varieties, also up to 115 and 120 g. The entire product range was already produced.

apr: How are the current sales going, in your opinion?
Bernd Scholbrock: Sales are exceptionally good. On the one hand, we are well prepared by announcing our new capacities, and on the other hand the market has taken a turn for the better at the end of last year with high demand both in Europe and overseas. Furthermore, there have been some failures in the production of kraftliner in the United States, which has further boosted the use of high-performance varieties. So we can safely state that the machine's standard capacity is fully exhausted.

apr: Would it be fair to say you are sold out?
Bernd Scholbrock: Yes, absolutely.

apr: What are your production goals for the full year in 2017?
Armin Vetter: We are expecting to produce a total of 420,000 tons at this location in 2017.

apr: What is your opinion on waste paper in terms of price? Security of supply is always an issue, and the prices are another matter.

Bernd Scholbrock: If you go to market with such a capacity, the procurement must be structurally sound in advance. And we have made sure of this. Although we are aware of the market's gloomy prediction that seasonal shortages will make a return with the local arrival of carnival and subsequent religious holidays. But we are also working on higher volume exports. In terms of volume, we can not reproduce this as of yet. However, we are noticing that the market is increasingly under pressure in terms of price, and we will have to contend with this.

apr: Implementing the construction of a new machine is a Herculean task, which usually entails a lot of overtime and additional strain on the staff for medium-sized companies. How did Schoellershammer handle this?

Alexander Stern: In a harmonious family business like ours, the workforce very much identifies with the company and the owner's family. Therefore, we are proud to say that our employees have given us so much support and personal commitment during the project planning and implementation phase that we were able to double the production capacity within the allotted time and cost schedule. Whenever our own capacities or technical knowledge were insufficient, we hired external service providers.

apr: What start-up curve do you have planned for the new machine?
Alexander Stern: The start-up curve was planned in close consultation with Voith. Our business plan provides for a quantity of 190,000 tons already in the first year, 2017. In 2018, we plan to produce and sell

Alexander Stern, Armin Vetter, and Bernd Scholbrock

PHOTO CREDIT: SCHOELLERSHAMMER

220,000 tons, and in 2019 we are looking forward to run at full capacity with 250,000 tons.

apr: What were the main obstacles that you have encountered before production became stable?
Armin Vetter: It took some time until we could produce consistently with the SpeedSizer. Commissioning the water circulation system was also challenging. Due to our objective of running an energetically optimized plant, we decided to use small bins and containers. This is somewhat more difficult to put into operation.

apr: How long did you have to contend with the SpeedSizer and what exactly did you do to resolve the problem?
Armin Vetter: At the beginning, we were only able to apply starch on one side. We had achieved the desired strength and were able to solve the problem by optimizing the drive control and through the appropriate selection of doctor blade profiles – together with Voith and Siemens.

Financing structure suitable for the business model

apr: As a family business, how did you manage the financing of the new machine?
Alexander Stern: Before we communicated the project to the financial markets, we underwent an intensive conceptual phase together with an external debt adviser. In cooperation with this consulting firm and our shareholders, we drafted a financing structure that fit the business model, which took into account many components of external financing and self-financing. In our approach, we were guided by the maxim of structuring conservative financing while leaving in place some leverage in case of a more volatile market environment.

apr: A family business can only manage such an investment with the support of banks. Banks are currently looking for borrowers, from what I hear. Have the banks run down your door to win you over as a borrower?
Alexander Stern: The project with an investment sum of 100 million euros, at the time we presented it to the banks, was very positively viewed and received. Almost all of the banks invited offered financing. So the financing is in place under consortium leadership, which is typically structured financing.

apr: What is your impression of the pricing policies of the containerboard producers over the last ten years?
Bernd Scholbrock: In the commodity sector, which includes containerboard, the supply/demand ratio very directly dictates the possible price range. All market participants have to deal with this, from customer to supplier. For paper manufacturers, it is important to take advantage of the „short" market phases in order to get a return on the capital invested. Of course, this may result in difficult demands on the customer under certain circumstances. On the other hand, suppliers are not spared either in times of oversupply. Basically, all parties know how it works, but price fluctuations are still heavily contested.

apr: How do you assess the current price situation for containerboard?
Bernd Scholbrock: In 2016, the prices were lowered to a level that is certainly inadequate. But since the beginning of the year the prices have recovered thanks to good market opportunities.

Corporations and retail markets are aware of their power

apr: From a historical point of view, waste paper prices are rather high, but they have been relatively stable for several years. Waste paper is the most important raw material for paper production. How do you forecast future price developments, and which factors will be decisive?
Bernd Scholbrock: Over the last 30 years the waste paper market has been characterized by a high degree of conglomeration, and the corporations and retail markets are aware of their power. Germany has become a net importer, and the price level is most likely not reversible. Thankfully, exporting to the Far East is no longer as price-dictating as it used to be in Germany, but the supplier market is no longer depending on it, either. We have to accept this, and in a competitive market we can only ensure the supply at „specific" good prices.

apr: How do you see Schoellershammer five years from now?
Alexander Stern: We are convinced that the megatrends, e.g., the online mail order business, will continue to provide significant growth opportunities for containerboard, and that we will be able to make use of the full capacity of our new and existing machines before the end of the five-year period that you mentioned. Schoellershammer will continue to be an independent, family-operated producer of containerboard in five years, which, by then, will certainly be forging plans again to increase the value for its customers, offer employees a more attractive workplace, and raise the company's value for shareholders.

apr: How do you feel about the successful start of the machine, now that it is more than four weeks behind you? Was it quite a relief for you? Are you very happy?
Armin Vetter: Yes, I am very happy. We have determined that the machine has no major defects. We can produce all varieties. We have achieved this in a short amount of time. At first, we thought we would be producing 80 g/m² no earlier than April, i.e., the fourth month after commissioning. But we have managed to achieve this already in the first month, and have found that we can produce the entire product range. The only thing missing is the necessary availability.
Bernd Scholbrock: I am also very relieved. It took many years of work and effort to prepare our company for this investment. The entrepreneurial risk came along with a unique opportunity to take the company to the next level and give it long-term sustainability.

apr: Thank you for the interview! ▮

The new PM6

PHOTO CREDIT: VOITH

Slitter winders

PHOTO CREDIT: VOITH

Voith scope of delivery overview

Paper machine
MasterJet Pro G with ModuleJet
Duoformer Base II
DuoCentri-NipcoFlex press
Pre- and after-drying section
Drying hood
Hall ventilation
SpeedSizer
Master Reel MR 125 for jumborolls with a diameter of 3.80 m
VariFlex reel sheeter
Machine controller
QCS (Quality Control System)

Material preparation
IntensaPulper
IntensaMaXX pulper disposal machine
IntegraScreen sorting machine
2 HiCon disc filters

Cover package

Services
Installation
Commissioning
Training
Service agreements

THE CORE PIECE OF THE LARGE INVESTMENT

FIRST VP PAPER MACHINE WITH A NEW CONCEPT

At Schoellershammer in Düren, the new packaging paper machine PM6 went into operation last December. It is designed for the production of light containerboard. Heidenheimer company Voith supplied the paper machine, including materials preparation, machine control, and the covering. No later than January, Schoellershammer was able to produce 10,000 tons of sellable paper.

The Schoellershammer paper factory has accomplished a masterful logistical feat. In just 18 months, new access roads, a storage area for wastepaper, a power station, a sewage treatment plant, a roll warehouse, and a building for the paper machine were all constructed. Voith manufactured the plant at the same time. Installation began in April 2016, and the PM6 was commissioned in early December. It took only until January for the machine to produce 10,000 tons of sellable paper. Schoellershammer's Managing Director Armin Vetter is delighted about the speedy handling and has nothing but praise for the cooperation with Voith: „From the first sales call to commissioning, our collaboration has always been fair and based on partnership. Voith was committed to our goals and developed solutions for our requests."

The Schoellershammer PM6 is one of the first paper machines of the new Voith-XcelLine. It is designed for packaging paper in the grammage range of 80 to 120 g/m². „We have planned the PM6 as an addition to our PM5, on which we will only produce grammages from 110 g/m² in the future. The light grades will be handled entirely on the PM6, allowing us to optimally use both plants," explains Armin Vetter. Schoellershammer strives to produce 500,000 tons of packaging paper per year on both machines.

As to the question of why the company chose Voith as its technology supplier, Vetter named two reasons: „It was important for us to work with a turnkey supplier who could provide everything from a single source, from the conveyor system for waste paper to the reel sheeter. Moreover, energy efficiency is very important to us. We strive

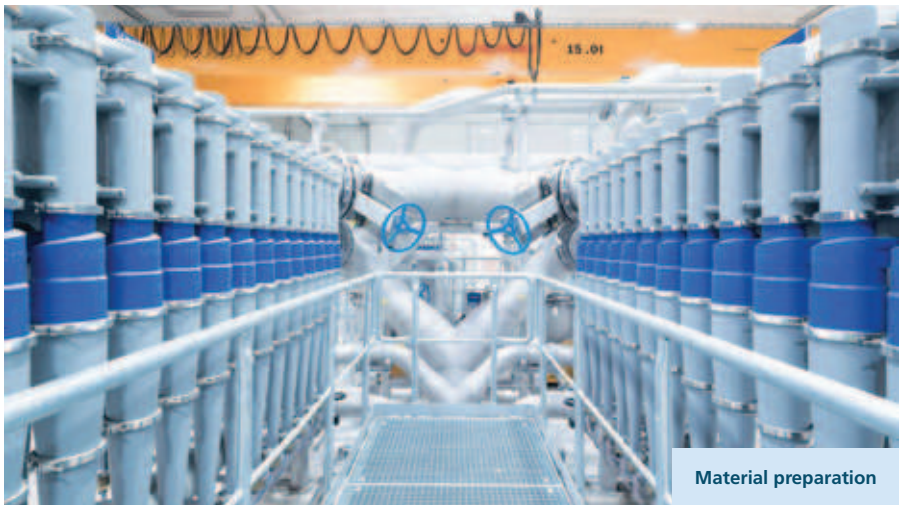

PHOTO CREDIT: VOITH

Material preparation

to set new standards and want to be the benchmark for packaging papers in Germany. With the BlueLine for material preparation and the new XcelLine paper machine, Voith has presented us a convincing offer."

The Schoellershammer PM6 features a MasterJet Pro G with ModuleJet. For the first time, the tried and tested Voith headbox for the PM6 has been designed with flexible lamellas and is therefore very accessible for cleaning and maintenance work, and this increases the operating window. In terms of the molder, Schoellershammer decided in favor of the DuoFormer Base II due to its very good dewatering performance, allowing the company to forego suction rolls. The press is a Voith DuoCentri-NipcoFlex press. The drying section consists of a pre-drying and after-drying section with a SpeedSizer film application unit. A MasterReel MR 125 with an EcoChange T was chosen for the reeling up of the jumborolls with a diameter of up to 3.80 m, which offers a high degree of change-over safety. The company also added a Voith VariFlex double drum winder with Voith-Gecko automatic gluing for start and end gluing.

The Voith BlueLine machines – consisting of IntensaPulper, the pulper disposal machine IntensaMaXX, the IntegraScreen sorting machine, and two HiCon disk filters – are used to prepare the material. When working together, the BlueLine machines ensure maximum energy efficiency and resource conservation. The initial forming screens, press felts, and dry screens were also provided by Voith.

Top view of the PM6 construction site

PHOTO CREDIT: (BOTH) SCHOELLERSHAMMER

HISTORY

FROM HYDROPOWER OPERATED HAMMER MILL TO MODERN PAPER PLANT

On October 12, 1784, brothers Schoeller were granted permission to operate an additional papermill by Elector of Theodore, Pfalzgraf Bei Rhine. A hammer mill operated on hydropower was converted to a papermill. This marked the birth of Schoellershammer – five years after the American declaration of independence and five years before the French Revolution.

In the age of enlightenment, education was en Vogue and the production of paper represented a growth market. The location and name have not changed since the company's inception. Its production was gradually mechanized during the industrial revolution. In 1841, the first Donkin (Fourdrinier) machine went into operation on the continent. This technique enabled the production of an endless paper web, which was a quantum leap for the development and growth of Schoellershammer. The high quality of the products won the gold medal at the Paris world exhibition in 1867. Schoellershammer became synonymous with high-quality print and artist papers, while hard technical drawing and transparency papers became their unique selling points. But eventually, war and destruction rang in the end of the golden age. In 1948, the resources for restoring paper machine 2 were available, and the machine was put into operation in 1949.

The old PM3, which produced high-quality photographic paper before the war, was converted in 1950 for the production of containerboard at Schoellers-

hammer. The lack of materials did not allow for the use of pulp initially, so peat and straw was used for production. In 1956, the PM1 (named after the Donkin machine) was set up for fine paper, followed in 1961 by the PM4 with a working width of 4.30 m for corrugated board, which was replaced in 1973 by the PM5 with a working width of 5 m, and which is still in use today. This investment was necessary as the widths of the machines are constantly changing. A development which was also decisive for our new PM6. The production output rose over the years to more than 225,000 tons annually, although the fine paper business has been declining since the 1980s. New technologies for technical drawing replace the well-known carrier papers for construction drawings and blueprints. Schoellershammer had to rethink and adapt once again. The only business area expected to grow was the packaging paper segment, which was boosted by the mail order business and the internet.

> » The location and name has not changed since the company's inception. «

This finding led to the decision to close the fine paper segment in two stages with the introduction of the new PM6. First, PM1 was shut down in August 2014, followed by PM3 in December 2015. Schoellershammer has exclusively produced packaging paper ever since. The enormous investment of around 100 million required a capital increase, and owner families Schoeller and Rhodius welcomed the Erfurt family as new shareholders. Now, the project could begin.

With the start-up of paper machine 6 in December 2016, Schoellershammer became an exclusive producer for brown containerboard with a capacity of more than 500,000 tons at a single location. At the

Raw waste paper plays an important role for Schoellershammer

PHOTO CREDIT:

same time, a new power plant was commissioned in cooperation with Getec, and the wastewater treatment capacity was doubled. Logistics were further enhanced through a new driveway and a new automatic warehouse. The market is growing, allowing Schoellershammer a soft market entry.

» EDI connection and consignment storage solutions «

Today, Schoellershammer is an independent, non-integrated supplier of containerboard. The company does not produce corrugated board itself, and its target customers are family-run manufacturers of corrugated board. For years, it has maintained strategically balanced relationships with independent and corporate companies in the market with a strong European orientation.

The Düren location has proved to be an ideal location in terms of logistics. From here, Schoellershammer can reach almost all countries in Europe at a reasonable cost. For overseas business, the company is using nearby sea ports such as Antwerp, Zeebrugge, and Rotterdam, but also Bremerhaven and Hamburg. Thanks to its container loading facilities, the company remains flexible and efficient, and can easily react to fluctuations in the market.

» Hammerliner established itself as an alternative to Testliner 1 «

For a wider range of offerings, Schoellershammer has several new products in its product range, among them the Twinhammer (duo use product) and the Hammerflute (HPF replacement), both of which have proven to be very popular. The Hammerliner variety has been on the market for several months and has established itself as an alternative to a testliner 1. These new products already account for a large share of the weekly production output at the company. Dirk van Meerbeck (sales manager): „This allows us to offer our customers a wide range of brown containerboard. With the second paper machine, Schoellershammer is able to ensure a continuous supply of its products to customers, as both paper machines can cover overlapping product segments." ∎


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The containerboard system at Eichhorn

INTERVIEW

"THE PRODUCT QUALITY OF THE PM6 CONVINCED US FROM THE START"

apr interviewed Hellmuth Eichhorn, Managing Partner of Carl Eichhorn KG, Jülich, and member of the VDW Board, on his long-standing relationship with Schoellershammer and the performance capabilities of the new PM6.

apr: What are the advantages and challenges of an independent, family-run producer of corrugated board boxes compared to fully integrated corporations?
Hellmuth Eichhorn: Carl Eichhorn KG offers systems to produce and process corrugated board into fully assembled packaging. Our strategy is focused on certain markets, such as the logistics industry, shipping, international trade, and similar sectors. As an independent, family-run company, any decisions necessary to support, supplement, or modify this strategy can be implemented at a moment's notice. Compared to large corporate groups, the advantage lies in the combination of a clear market focus and short decision-making channels.
We stopped manufacturing paper ourselves some 25 years ago. We have never regretted giving up this value chain. We have relationships with paper suppliers that have been mutually nourished for decades. Naturally, we focus particularly on non-integrated, independent paper manufacturers, such as Schoellershammer. So, essentially, if you are in harmony with your partners' strategies, there is no disadvantage compared to corporations.

Hellmuth Eichhorn, Managing Partner of Carl Eichhorn KG

apr: As an integrated packaging manufacturer, how do you view the competition with independent processors who obtain corrugated sheets from third parties?
Hellmuth Eichhorn: Principally, foregoing a value chain is not a competitive disadvan-

tage. This is confirmed by competitors who have maintained or expanded their market positions in the past 15 to 20 years without an in-house corrugator. The number of value-added stages that a company has available is not decisive for its success. We compete with companies that have fewer value chains, and others that have more. And Eichhorn has developed well in these market conditions and competitive environment.

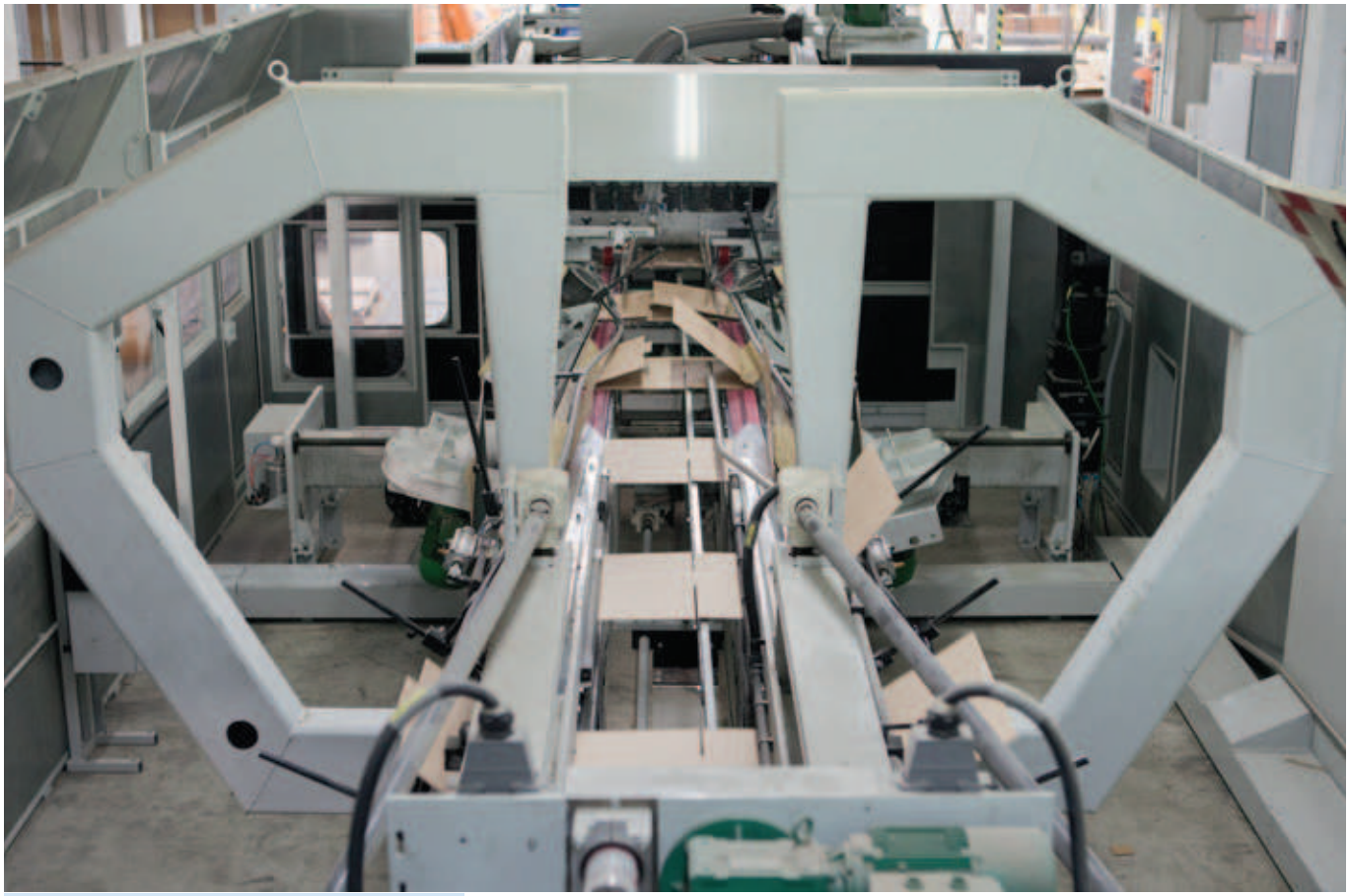
apr: What possibilities are there, in your opinion, to distinguish yourself from the competition in terms of flexibility and customer orientation?
Hellmuth Eichhorn: For more than 50 percent of our production at the Kirchberg site, we provide our customers with „just-in-time" deliveries. This requires a high degree of flexibility in the entire supply chain. In terms of preparation, this entails short transport distances for the raw materials to us, EDI connection for efficient data exchange as well as consignment warehouses to meet short-term market requirements. To achieve this, we need reliable partners such as Schoellershammer.

Erosion of margins

apr: What are the challenges associated with the recently growing capacity in corrugated board?
Hellmuth Eichhorn: The strong capacity expansion in corrugated board in recent years has led to eroding margins. In this situation, every company is called upon to review its strategy, adapt if necessary, and develop ideas to counter the cost pressures. One possible solution is to make the supply chain even more efficient. Such measures can be discussed and implemented at a moment's notice if you have longstanding partnerships between family businesses.

apr: What is your opinion on the security of supply in times of a paper market that is experiencing supply bottlenecks, at least at this moment?
Hellmuth Eichhorn: Proven partnerships with our paper suppliers guarantee us 100 percent security of supply. What matters here is mutual reliability.

apr: Do you believe that the trend towards low grammages and varieties which can be



Folding box adhesive machine at Eichhorn

used both as linerboard and as kraftboard is sustainable?

Hellmuth Eichhorn: We believe this trend will continue. However, we foresee an increase in the significance of low grammages rather than a further deterioration in the absolute coating weight. Furthermore, manufacturers of primary fiber containerboard – the availability of which has recently fluctuated strongly and which must be planned for long-term – are becoming aware that they are competing with waste-paper-based, so-called high-performance grades.

apr: What is your assessment of the new high-performance papers on a secondary fiber basis compared to primary fiber papers?

Hellmuth Eichhorn: Thus far, they are offering high and fast availability with nearly identical technical characteristics. But beyond that, we can easily adapt to the specific quality requirements of any given packaging type.

Containerboard on the way to the buyer's market

apr: What are your market expectations as regards the new capacities shortly becoming available in Europe?

Hellmuth Eichhorn: The significant increase in paper production capacity will tend to cause a buyer's market. Just how pronounced and persistent this situation will be depends on how the demand in Europe develops, and secondly on the ability of paper producers to market surplus quantities to areas outside of Europe. In the past, the paper industry was quite successful in this regard.

apr: As a customer of Schoellershammer, how did you experience the start-up of the PM6 and the market launch?

Hellmuth Eichhorn: The market phase was fortunate for Schoellershammer and thus perfect for all parties involved. The successful start-up ensures high delivery reliability, particularly in an overheated market. The timing and implementation were perfect, in my opinion. The quality of the products of the new PM6 won us over from the start.

The construction starts with the foundation, which must be capable of bearing a lot of weight

The building takes shape

CHRONOLOGY

A COLOSSUS WITH A SPECIAL INTERIOR IS BORN

The construction of a 100 million euro investment is an endeavor that requires top planning and precise coordination between all parties involved. Paper machine construction sites may look chaotic to people who are not part of the process. But upon closer examination, it becomes clear that the individual elements are akin to the wheels and cogs of a precision clock.

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The interior work begins

The paper machine under construction

Complete view of the new PM6

Pre-dryer section of the PM6

Roll winding

Fractionation in material preparation

ENERGY SUPPLY

CONTRIBUTING TO THE ENERGY REVOLUTION

Schoellershammer commissioned energy service provider Getec heat & power AG from Magdeburg for the power supply.

As part of custom-tailored contracting, Getec provided extensive services from concept development and financing, approval planning and implementation through plant engineering to final commissioning and subsequent operation of the plant. The company from Magdeburg invested an eight figure sum.

In order to realize communication with the new power generation plant and to be ready for Industry 4.0, Getec has updated the control system of the current boiler plant with the latest technologies. Furthermore, the existing water treatment system was expanded and optimized. The frequently occurring problem of sheet breaks in the paper machine is counteracted with the shell boiler technology used. This boiler concept is characterized by its high storage and regulating capacity. Short-term fluctuations in steam removal can be compensated without any problems.

Combined heat and power (CHP) as an energy efficiency tool is the third pillar of power generation. The highly efficient CHP plant meets the requirements for a sustainable supply of energy at the Düren site and at the same time does its part to contribute to the energy revolution. The plant generates a heat volume of approx. 180 GWh/a with a steam output of maximum 71 t/h at 6.5 bar of slightly superheated steam at 180 °C. The electricity generated through CHP covers the requirements of the power plant as well as part of the paper factory. Through the simultaneous production of heat and electricity, the CHP plant has an efficiency factor of more than 90 percent and is therefore very resource-friendly.

Getec used a fuel mix to be able to react flexibly to any price fluctuations. The new cogeneration plant went online in February 2017 after a construction period of about eight months. Following installation, the energy service provider will also be responsible for technical management, maintenance, monitoring, and technical controlling of the plant.

EMSR INSTALLATION

300,000 M OF CABLE INSTALLED AND CHECKED

Schoellershammer hired Veltec's automation team to install the EMSR, build the switch cabinet, and handle the commissioning phase.

It took 40 employees approximately 28,000 working hours to implement all steps necessary for commissioning the new PM6 paper machine, including electrical, measuring, and control technology (EMSR). The teams installed the cable ducts, wired the low voltage systems and the fieldbus systems. The scope of services rendered included installation, cabling, and connection of instrumentation field devices, installation of instrumental air distributors, remote I/O as well as electrical and motor connections of the new paper machine in the new building.

In total, Veltec installed more than 300,000 meters of cable, over 8,000 meters of cable trenches, and installed about 1,500 measuring and triggering facilities. This means that the entire paper machine PM6 can be controlled and regulated via electrical signals.

All signals were checked by the automation team in so-called signal tests. All individual functions (motors, pumps, control valves) and measurements (pressure, temperature, flow) were tested in consideration of the following:

- Is each cable connected correctly?
- Are all signals correctly forwarded to the PCS7 process control system?
- Are all signals, limit values, and alarms correct?

The latter consideration is particularly important for plant operators, because if a limit value is exceeded, the paper machine may malfunction, potentially resulting in production downtime.

Comprehensive project management and support during commissioning were also part of the order. As different trades started working simultaneously, the various teams had to closely coordinate their operations in very tight spaces.

Waldemar Schombera, Sales Manager Automation and MES at Veltec: "We have already implemented numerous automation and EMSR assembly projects for customers of different sizes and in different industries. We offer innovative solutions and a continuously high quality of services."

For customers, the advantage is that the electrical and instrumentation and control systems can be obtained from a single source – from the planning stage, through engineering, to the commissioning of control and process control systems.

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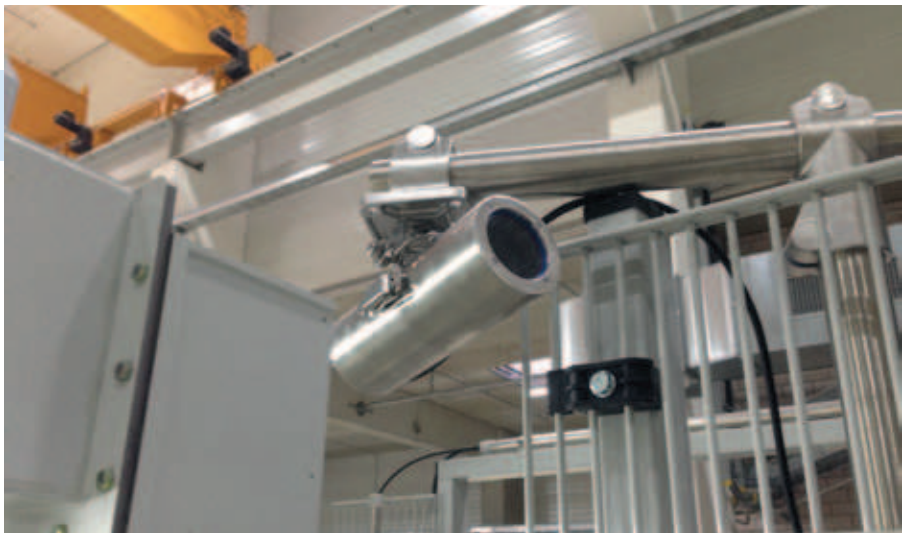

Camera system from Senmicro

PHOTO CREDIT: SENMICRO

QUALITY

ONLINE INSPECTION BY VIDEO

Schoellershammer GmbH & Co. KG is using the InVision-VideoMaster system from Senmicro GmbH from Amstetten, Austria, to inspect sheet breaks on its new PM6 production line.

Thanks to modern CMOS sensors, the cameras used provide images that are time- and/or position-synchronous and which can be mirrored for viewing. This makes it possible to render precise cause analyses. The sheet break videos of the individual camera positions can be loaded and analyzed after the critical event without delay. For image capture, Senmicro relies on the products of its partner company Basler.

Outstanding price/performance ratio

Basler is a leading manufacturer of digital cameras for applications in industry, medicine, transport, and retail. The products developed are driven by the demands of the industry. The cameras offer easy integration, compact sizes, excellent image quality, and an outstanding price/performance ratio. Basler has more than 25 years of experience in the field of image processing.

Unlike with competitors' products, Senmicro is opting for a compact camera housing, transmission of data via optical fibers, and processing of the images in a data center. This makes it possible to implement an unlimited number of cameras, and future expansions are very affordable and simple. Cameras can be placed optimally even in difficult-to-reach locations, allowing strategic points of the process to be monitored.

» air-cooled camera/LED headlamp housing «

Quick access to video files

One of the effects that users particularly appreciate is fast access to the video files after a sheet break. A further advantage of the design is the minimized exposure of system parts to the dirt, heat, and moisture in the field. This has a positive impact on maintenance and the expenditures required for spare parts.

The camera and LED headlamp housing are water-cooled. This results in significant cost savings compared to cooling with compressed air. The housings are designed directly at Senmicro, while the manufacturing is carried out by regional partner companies.

The InVision-VideoMaster software used was developed by an in-house team and is available for all common Windows operating systems (Windows 7, Windows 10, Windows Server). The software architecture allows for easy expansion of the computing performance and thus higher image rates by simply adding additional storage capacity and CPUs. Furthermore, the need to shutdown machines for maintenance and conversion is minimized. The diagnostics software used to classify the cause of the sheet break is included free of charge with the starter package and can be installed on up to 99 PCs.

Senmicro, founded in 2008, has made a name for itself primarily in the field of non-contact measurement procedures and sensor systems. The company has been increasingly committed to the development of distributed image processing systems over the past few years. ▮

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Veltec ist der Service-Spezialist für die Prozess- und Kraftwerksindustrie. Egal ob eine technische Anlage optimiert, automatisiert oder instand gehalten werden muss – unsere professionellen Teams bieten für alles eine maßgeschneiderte und sichere Lösung.

veltec
Industrial Services

Roll conveyor belts directly after the paper machine

PHOTO CREDIT: MSB (ALL IMAGES)

The rolls are tilted for upright storage

IN-HOUSE LOGISTICS

ROLL TRANSPORT AND STORAGE

The fully automatic roll transport system for the new Schoellershammer PM6 was delivered by a local neighbor of the paper factory: MSB, a company based in Düren. The medium-sized machine and plant builder has gained vast experience through numerous projects with other paper manufacturers.

The roll transport system is used for the fully automatic transfer of finished rolls (up to four tons) from the roll slitter via a transport bridge to the automatic crane storage and from there to dispatch.

After automatic ejection by the reel sheeter and while still in the paper machine hall, the rolls with a width of up to 3350 mm and a diameter of up to 1500 mm are received as a complete lying roll toss and are then separated for further handling. Next, the rolls are weighed, labeled with an internal barcode, coded with lettering on the front sides, and, depending on the customer's wishes, banded with plastic tape on the roll ends for transport protection.

The conveyor belts, consisting of stable steel lamellas, are on ground level in this area and can thus be walked on and driven over for maintenance.

Roll transport with up to 64 rolls per hour

The complete MSB roll transport system can move up to 64 individual paper rolls

and is operated with an S7 controller, which is in constant communication with other control systems such as the reel sheeter, internal operation data acquisition, fire protection technology, warehouse management, and crane control.

At the core of in-house roll logistics is a fully automatic crane warehouse with two independently operated crane systems with vacuum lifters that serve as load receivers, and which stack the individual paper rolls in towers of up to 15 m in height.

The MSB roll transport system transports the individual paper rolls to the respective transfer points of the cranes and in turn receives the rolls which are ready for shipping.

As the rolls are stored in an upright position, they are tilted from the lying position to the upright position when the conveyor system enters the storage area, and they are simultaneously lowered from the machine level to the storage level. This is carried out by an electric tilting chair, which is also designed for the maximum speed of 64 rolls per hour. From this point forward until loading, the rolls are transported on 1 m wide plate conveyors mounted on the ground.

The conveyor line between the reel sheeter and the storage points may be operated either in buffer mode for maximum storage efficiency or in continuous mode for fast supply to the cranes.

Generally, each of the paper rolls produced is stored in the crane warehouse. Under certain circumstances, it is possible to transport the rolls directly from the reel cutter to the loading station, thus fully bypassing the cranes.

After a truck arrives on the factory premises, a corresponding removal order is sent to the roll warehouse. The paper rolls for this particular customer are then transferred from the cranes to the MSB roll transport system.

Once they leave the warehouse area and are on the transport system, each dispatched roll is provided with a shipping label size A3 on the roll cover with information for the customer.

Next, buffer conveyors located outside the warehouse buffer the rolls in batches. They are then ready for pick up by the clamp forklift for truck loading. It is possible to load two trucks at a time. ▮

PLANNING

WEYER GRUPPE PREPARES APPLICATION DOCUMENTS FOR PM6

Andrea Esser, responsible for approval processes at weyer gruppe

PHOTO CREDIT: PROBIOTEC GMBH

The application for regulatory approval to install and operate the new PM6 paper machine, and thus expand containerboard production capacity, was prepared by weyer gruppe Probiotec GmbH, Düren. The application covered the paper machine with material preparation, the roll warehouse, waste paper storage, and the expansion of the in-house waste water treatment plant, which included the construction of a cogeneration unit for biogas.

Andrea Esser of weyer gruppe, a publicly appointed and sworn expert for approval procedures in the environmental field, summarizes the peculiarities of the approval process: „We were faced with several challenges: On the one hand, all the data and documents for the individual approval objects had to be coordinated and compiled by various planners with different responsibilities. Secondly, the factory is situated adjacent to a very sensitive flora-fauna habitat, which required our project to be examined for FFH compatibility." Emissions control approval was granted in July 2015, so that the construction of the plant was started as scheduled.

PHOTO CREDIT: PROBIOTEC GMBH

The approval documents were large in scope

weyer gruppe handled the following components for approval:

- Approval management and coordination of external expert opinions
- Preparation of the German "BImSchG" approval application
- Environmental impact assessment
- Examination of FFH compatibility, including calculation of substance infiltration
- Fire safety concept
- Initial status report on the soil and groundwater for the entire plant
- Application for permission to direct rainwater into the Rur

The PM6 construction site – Installation of heavy parts

PHOTO CREDIT: SCHOELLERSHAMMER

Top view of the PM6 construction site

PHOTO CREDIT: BHM

CONSTRUCTION PLANNING PM6

CUSTOMER BENEFIT THROUGH INTEGRATED CONSTRUCTION PLANNING

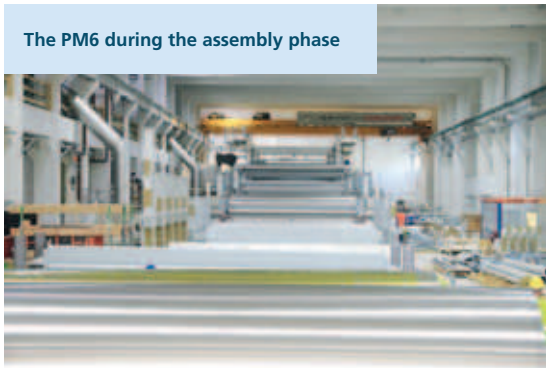
The PM6 plant is constructed directly adjacent to the existing premises at the Düren site and comprises a complete production line consisting of material preparation, PM hall with office building, roll warehouse, and wastewater treatment plant. The associated outdoor installations include a storage area for waste paper and a new access road, including a railway crossing for the Rurtalbahn. This resulted in a challenging task for organizing the construction, structural analysis / support structure planning, building services, fire protection, and infrastructure planning.

Using integrated planning to cover all trades, Austrian company BHM Ingenieure from Feldkirch was able to come up with economical solutions that fit both the schedule and budget, and which were subsequently presented to Schoellershammer in detail. The many years of experience of the BHM engineers from international projects in the paper industry proved valuable. Comprehensive, single-source solutions offered Schoellershammer the greatest possible benefit. The entire planning chain included the preliminary project, submission, assistance in administrative procedures, as well as detail and implementation planning. This required close, flexible collaboration with all technology planners and plant suppliers.

> » new access road, including a railway crossing for the Rurtalbahn «

Responsibility for planning process

The project scope included the management of a 15,000 m² outdoor space for buildings along with 260,000 m³ of converted space, as well as buildings in prefabricated skeleton construction and a surface foundation with soil replacement. Project manager Dipl.-Ing. Dr. Alfred Schmid from BHM Ingenieure was responsible for the intensive planning process. Contractors were selected via tendering and competition. Many local companies were ultimately selected as the best bidders. Local construction supervision by the company ensured that the planned quality, costs, and deadlines were adhered to. Another important task was to resolve issues that arose during construction. Schoellershammer was a very fair partner and principle with clear ideas and support in all situations. ▮



The PM6 during the assembly phase

Specially coated dry coolers

PHOTO CREDIT: BM GREEN COOLING

ENERGY EFFICIENCY

RIVER WATER COOLS CONTROL ROOM AND IS PRE-HEATED FOR PRODUCTION

In the switching rooms of the new PM6 installation, the power parts and electronics create a considerable heat load. Without air-conditioning, the temperatures would be far above the specified values within just a few minutes.

This would cause the power electronics to fail. In order to provide energy-efficient air-conditioning to the individual switch rooms, special water-cooled air-conditioners were installed. Their registers and tubes are coated with an anti-corrosive varnish to prevent the impact of aggressive gases.

Optimized medium temperatures

The system's concept is designed to provide medium temperatures to the control rooms of 16 °C in the flow, and 20 °C in the return line. The plant components used have been specially designed for these high medium temperatures. One of the great advantages at this temperature is that no energy is wasted for air dehumidification in the control rooms, and the energy consumption of the plant is very low due to cooling with Rur water with approx. 5,425 hours per year.

The total installed mechanical refrigeration has a cooling capacity of 786 kW, whereby one circuit of a cooling water aggregate is used for redundancy, so that an effective cooling capacity of 655 kW is available. This redundancy ensures operational reliability for 365 days of operation. The complete refrigeration unit is housed in a machine room. This is where all three cold water aggregates, heat exchangers for cooling water, and all associated pumps as well as control elements required for refrigeration are located.

Full use of waste heat for production

The heat exchanger for river water cooling also heats the Rur water by 4 Kelvin. The heated water is then made available to production. This is the main mode of operation of the system. If the river water is too warm, the system will switch to cooling mode or machine cooling mode, depending on the outside temperature.

The river water cooling mode is operated approx. 5425 hours per year (62%). The passive cooling mode is used approx. 1304 hours per year (15%). Only when the Rur water and the outside temperature are too high, will the cold water aggregates be run load-dependent about 2031 hours per year (23%). At the same time, these three

operating modes ensure complete technical redundancy. The dryers, which are specially designed according to customer requirements, were installed on a steel frame above the cooling center. Each of the 30 EC fans installed can be folded open individually. This is the only way to clean the heat exchanger coil using the counter-current process. The heat exchangers and the collection tubes on the dryers are specially coated against aggressive gases.

> » The plant components have been designed specifically for high-temperature media. «

Conforms to water legislation

A retainer system was installed below each dry cooler which captures any leaking water/glycol liquids and signals this to the MSR control cabinet. These messages are then automatically reported to the control system of the paper machine. The output of the dryers is designed for an external temperature of 38 °C (according to DIN 35 °C would suffice). This ensures smooth operations during the summer. The dry coolers handle the liquefaction for the compressors in machine operation and passive cooling at low exterior temperatures.

Each climatic chamber features a leakage system contained in a double floor, which sends a signal via the bus system to the main MRS cabinet if a leak is detected. The MSR cabinet monitors all installed components via the bus system and forwards messages and operating conditions of the system to the paper machine's control system.

Alternative water sources

The overall concept is designed flexibly, so that other customers may use well water instead of river water. In most cases, mechanical cooling can be omitted entirely, since the well water usually has a temperature of =<14 °C year-round.

Schematic diagram of the switching room cooling

PHOTO CREDIT: BM GREEN COOLING

Central measuring, control (MSR) and regulation cabinet based on the Siemens S7 operating instructions

Control cabinets equipped with Sinamics S120 converters and 3WL circuit breakers

PHOTO CREDIT: SIEMENS

Low-voltage Simotics motor ensemble for the paper machine press section

PROPULSION SYSTEMS

NEW PAPER MACHINE WITH CONTINUOUS DRIVE SOLUTION SIPAPER

The fact that demand for graphical paper is dropping by around 5 percent annually is negated by the increased demand for packaging paper.

For a continuous drive solution and easier handling of the new machine, the company is relying on Siemens' Sipaper portfolio, allowing them to increase the production capacity at the same time.

Schoellershammer GmbH & Co. KG produces about 1500 km of paper in its plants – per paper machine, per day. To do so, the company uses state-of-the-art technologies and networked production. Siemens provides everything from a single source with tailor-made products and solutions for the pulp and paper industry. The drive solution is provided by the innovative Sipaper Drives APL Standard in conjunction with the Sinamics S120 drive technology, which consists of low-voltage converters, control cabinets, and the corresponding Simotics low-voltage motors. With this integrated drive system, all components are perfectly matched to one another and work together smoothly. The standard components of the Sipaper solution are individually configured to the requirements of the PM6. With its industry-specific control and regulation functions, the Sipaper Drives APL Software Standard ensures failure-free production. This offers Schoellershammer optimal quality for controlling with a significantly reduced risk of web breaks.

Virtualization solutions

As the basis for the integrated drive solution, Siemens offers „Simatic Virtualization as a Service" (SIVaaS), a simple implementation of virtualization solutions. The operating system and the user software are decoupled from the hardware and merged in virtual machines. As a result, Schoellershammer enjoys several advantages. For example, there are no problems with any interfaces thanks to the interconnected Siemens PCS7 system. Moreover, no further system training is required. The uniform operating concept reduces the need for training and simultaneously minimizes the probability of operator errors. Through intelligently combining the PCs in a virtual system divided into two hosts, the production process is centrally managed, diagnosed, and maintained. And the system can be expanded at any time. This minimizes the effort and increases the flexibility and availability of the system.

Project partners see eye-to-eye

Siemens in close cooperation with Voith GmbH & Co. KG have implemented the project in a very short period of time. The machine and process control were provided by the machine supplier from Heidenheim. The planning and technical point of contact for Siemens was provided by TBP Piesslinger GmbH, Linz. But this was not the first time that Schoellershammer has used Siemens technology: Siemens products were already used to convert the roller cutter on the PM5. ▮

SUPPLY

LONGSTANDING ELECTRO-TECHNICAL SUPPLIER

Actemium Cegelec GmbH from Cologne, Germany, has been a supplier for Schoellershammer for decades, providing all electro-technical equipment for the power supply gear and production machines, including assembly and commissioning.

For the construction of the new paper machine, Actemium received the following orders: Actemium was commissioned by Schoellershammer to supply, assemble, and install the low-voltage main distributions in MCC technology: six plant sections for 690 V and 400 V switchgear, and a total of 90 arrays with 400 outputs and six reactive compensation units. Two additional UPS systems were supplied and installed.

Orders from Siemens and BVG

Actemium was commissioned by Siemens to install the control cabinets, the multi-motor drive, and the individual frequency inverter drives in four plant sections, which comprises a switchgear length of more than 50 m. Actemium was also awarded an order from BVG for installing the electrical gear for the new starch plant.

Moreover, various jobs were carried out on behalf of Schoellershammer for the purpose of preparing the existing plant for the requirements of PM6, particularly in terms of energy supply and medium voltage switchgear. After the start-up phase of the PM6, Actemium was commissioned by Schoellershammer to carry out the first modifications for plant optimization. Actemium will thus continue to provide support for Schoellershammer's PM6.

» Actemium has been a supplier for Schoellershammer for decades. «

PHOTO CREDIT: ACTEMIUM

An employee of Actemium during assembly

PHOTO CREDIT: BVG

Starch silo

NO SOLID PAPER WITHOUT GLUE

TURNKEY STARCH PLANT AND WORKSTATION FOR THE SPEED-SIZER

For Schoellershammer's PM6 project, the company tasked BVG Bauer-Verfahrenstechnik-GmbH from the Bavarian town of Greifenberg with supplying the enzymatic starch removal plant, the Speed-Sizer workstation, and the bentonite plant.

PHOTO CREDIT: BVG

The bentonite plant

The plant was delivered as a turnkey system, i.e., including the piping, electrical installations, programming, engineering including assembly and commissioning. The contract is a continuation of the good business relationship that has existed between Schoellershammer and BVG for many years. Back in 2005, the company was hired to convert the existing workstation of the PM5, and in 2008 to supply an enzymatic starch plant, also on the PM5. The BVG plant was positioned near the glue press, which was considered a unique approach compared to the old plant. This eliminated the very long conveying paths required for the old plant. It also facilitated savings in pump power and flushing water, among other things.

In 2013, BVG supplied a Super-Strainer PLC for the PM5's Opti-Spray. This project was also implemented to the full satisfaction of the customer and met the high expectations in this technology right away.

At the core of the delivery is the enzymatic starch extraction plant Super-ECC, of which 190 units have sold worldwide since the first prototype was released in 1978. No other supplier of starch plants can match this achievement. With this technology, BVG retains a market share of approx. 90 percent. In 2016 alone the company sold or commissioned 16 plants. The unique BVG clean design has set new industry standards.

One of the new achievements, for example, is the „high turbulence starch degradation" process, in which the quality of the starch pastes produced is increased once more. This process is patented in Europe. Another highlight is the „sewage-free" starch preparation process „no-poll." Here, the starch-containing wastewater accumulated during the start-up and shutdown of the plant is recycled. This concept is also patented in Europe. Another new development is the continuous driving system, which enables „on demand" starch production, i.e., the system adapts to the consumption on the film press.

The workstation has many new features as well. The container, named „Separator GS" by BVG, is designed to allow sand and heavy impurities to sediment so

they can be removed from the bottom of the unit. In light of the ongoing deterioration of waste paper, this is a highly welcome feature. Among other things, the removal of sand has the advantage that the paper strength increases and that the roll covers are subject to less wear. At Schoellershammer, a so-called „kidney loop" is also installed in the workstation, a device that eliminates fibers and light dirt from the cycle to the film press. The kidney loop is operated in bypass flow mode and therefore has no impact on the machine cycle's pressure conditions. This device has also been granted a European patent.

The order for the PM6 comprises the following:

Starch plant

- Strength silo for starch powders with a volume of 248 m³
- Continuous slurry production, installed under the silo with a special
- Controller for slurry concentration
- Enzymatic starch extraction plant
- BVG-Super-ECC with a processing capacity of max. 50 tons of native starch per day
- Supply tank for concentrated starch paste with a volume of 25 m³
- Ring pipe to the workstations
- Two workstations for supplying the Speed-Sizer, consisting of:
  - two online dilution stations for the glue
  - two work containers type Separator GS
  - four centrifugal pumps, two of which in standby
  - two pressure filters BVG-Super-Strainer ST upstream of Speed-Sizer
  - two pressure filters BVG-Super Strainer SPS as kidney loop
  - two machine circuits
  - hot water preparation for heating up the starch bath to 85 °C

Bentonite plant

Bentonite silo for bentonite powder with a volume of 80 m³ continuous slurry production under the silo with two chamber systems; direct conveying to the metering stations.

Trucks can drive to both warehouses for pick-up successively, if needed; waiting times have been optimized via pre-simulation.

PHOTO CREDIT: (BOTH) TEREX

LOGISTICS

EXTRA LARGE AUTOMATED MATERIAL FLOW

Along with its new paper machine, the Schoellershammer paper factory in Düren has commissioned a new automatic warehouse.

The company selected process crane technology from Demag, also receiving the support of experts for the optimization of in-house logistics – even yard management was included, i.e., organizing the truck traffic on the company's premises.

Ten years of experience with automatic storage

Providing top quality paper is not the only goal of the family business which was founded in 1784, they the also strive to enable seamless procedures and shipments. This is where logistics play an important role. In terms of inbound traffic, the deliveries of waste paper must be organized in two shifts from 7:00 am to 8:00 pm. In terms of outbound traffic, freight forwarders and customers want short waiting times with prompt and reliable loading around the clock.

To ensure this, almost 15 years ago Schoellershammer commissioned fully automatic crane storage for the PM5. When at full capacity, paper rolls with a maximum total weight of around 9200 tons are stored here. Several rolls are stacked one above the other up to a height of 15 m in a tower-like fashion. The cranes are controlled by a Demag warehouse management system (LVS), which is installed in a virtual environment and integrated in Schoellershammer's IT infrastructure. A vacuum lifter is used to lift the rolls.

Process cranes in 24/7 operation

The transshipments in this warehouse – automatic warehouse AL5, assigned to the PM – was initially handled by a single process crane. In 2011, the warehouse was equipped with a second Demag automatic crane, which runs on the same crane runway. This expansion had already been prepared for during the construction of the warehouse.

The storage capacity of 8000 t corresponds to an output of about ten daily production loads of the PM5. This means that turnover is high and the fully automated cranes are working at an intense rate, since the plants operate around the clock and retrievals are handled in a comparatively large time window of 12 to 16 hours per day.

New shipping warehouse with 12,000 t capacity

Schoellershammer has erected a new shipping warehouse with a capacity of 12,270 tons for the new paper machine PM6, in which another two Demag process cranes of type ZKKW 4.2 t x 30.42 m handle the

fully automatic transfer of paper rolls. The rolls with a maximum diameter of 1500 mm and a maximum weight of 4.2 tons are automatically transferred to the storage location assigned by the parent LVS. The warehouse features a floor area of approx. 66 x 30 m. The maximum stacking height of the rolls is 15 m.

58 rolls per hour loaded and unloaded

Frequency-controlled drives are used to achieve the necessary transport cycles. The crane and catwalk achieve speeds of up to 100 m/min. The lifting and lowering movement without load can achieve a speed of up to 120 m/min. MPW-type Demag winches are used for the hoisting mechanism. The system transfer capacity of the AL 6 was determined to be 54 rolls/hour when either loading or unloading only. Combined loading or unloading yields a system performance of 58 rolls. These theoretically determined values were verified in a performance test after installation and have proven accurate.

Complex flow of materials

With the second warehouse, the internal material flow of finished goods is much more complex. Now there are two warehouses for different product groups, i.e., for containerboard with high and low grammage. As many customers order both of these types, the logistics experts at Schoellershammer were quickly confronted with the question of how to best organize the material flow and the flow of trucks on the premises.

This question is anything but trivial. Andreas Penner, Head of Shipping at Schoellershammer: "In a commodity market like ours, service is decisive for customer satisfaction. That's why we play close attention to ensuring perfectly smooth processing until goods are delivered to our customers, and we continually strive to improve our services through the use of modern resources."

Simulation of complete material flow

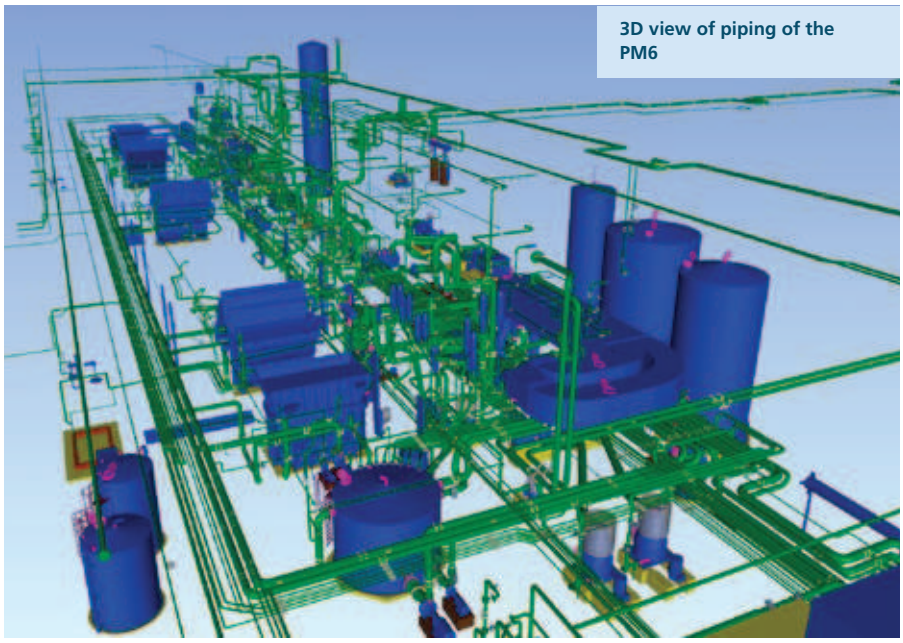
One of these resources is a new system, a so-called "Yard Management System." As soon as the forwarding agency has booked a time period and the truck has been weighed on arrival, the truck driver logs on to a terminal. The system then guides the vehicle through the plant and assigns it a space at the dispatch location, for example.

Truck waiting times drastically reduced

The results of a prior simulation were consistently implemented. With double loading, the trucks drive to the respective loading positions at the two shipping warehouses AL5 and AL6. As a result of this and other optimization measures, trucks can now expect a shorter stay and are back on the road to the customer more quickly. Dr. Thomas Bönker: "The average truck waiting time was significantly reduced, and the maximum number of trucks in the waiting zone was also markedly optimized." This also demonstrates the efficiency and usability of the simulation tools used – and Demag's competence in improving all intralogistic processes, from crane technology to warehouse. ▮

Two process cranes handle the gentle storage and timely removal of the paper rolls.

Hartwig Fischer, Head of Sales and consultant, 37 years of TBP experience



3D view of piping of the PM6

PHOTOS: TBP

PLANNING

ENGINEERING FROM A SINGLE SOURCE

TBP Engineering GmbH, Linz, Austria, is an engineering service company that has combined all areas of consulting, engineering, and processing as a general planner for 65 years, whether for the paper/pulp and sugar/starch industry, petrochemical, or power stations.

The production plant was put into operation at the beginning of December 2016 after 16 months of construction and installation. The PM6 is a modern paper machine from Heidenheim (Germany) company Voith, featuring a production capacity of 850 t/day, 5.60 m working width, and a production speed of 1200 m/min. The product portfolio includes testliner and corrugated material in the grammage range of 80 to 120 g/m².

After TBP had already managed the basic engineering aspects and the regulatory application, the complete documentation for detailed engineering as well as process and electrical, measuring, and control technology (EMRT) for this project became their responsibility. It included the complete production line from waste paper bale transport system, through material preparation, the PM6 line to the finished roll warehouse. Only the expansion of the

» Extensive procurement «

peripheral ancillary plants, such as the freshwater treatment, wastewater treatment plant, and boiler house were planned by our own planners and suppliers.

The extensive procurement activities were also the responsibility of TBP. All detail and procurement engineering was completed within one year. As always, planning aids such as simulation programs, P&ID, and the PDMS 3D model planning tool were used. TBP was able to draw on extensive references for this project and provide the customer with optimum support through all phases of the project.

The groundbreaking ceremony took place in July 2015. Installation activities were launched in April 2016. The services rendered by TBP included installation supervision for machinery, pipeline, and EMRT assemblies. Despite various adversities, the assembly schedule was essentially met. The operators managed to produce the first tambour in December 2016. ▮

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Expertise in container construction

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VENTILATION TECHNOLOGY AND ASSEMBLY

UNIVERSALISTS WITH EXTENSIVE EXPERIENCE

K industries GmbH, an Austrian family business, is considered a reliable partner for highly complex projects in the paper industry.

K industries GmbH (formerly Kresta) provides mechanical engineering, as well as pipeline and tank construction.

„I still find it fascinating to witness the birth of a paper machine first hand," said Martin Kreuzer, who was the designated project manager from K industries for the assembly of the new PM6 at Schoellershammer. According to him, it is most satisfying when the client approves of the service rendered.

16,000 meters of piping

K industries was responsible for assembling the entire ventilation technology of the new paper machine at Schoellershammer. No less than 16,000 meters of piping had to be installed. Thanks to the excellent cooperation between machine suppliers, the end customer, and K industries, the assembly took just six months.

„Tough deadlines are particularly motivating for our employees, and they are proud when they actually meet them. Of course, top notch installation quality is a given," said Martin Kreuzer. On average, 60 installers from K industries – or the former Kresta – were working on site in Düren.

Experienced installers are the key factor for success

The experienced installers are a key factor for success. They consider themselves to be the quasi „contractor of the respective project". A good mix of experienced staff and younger technicians facilitated efficient handling.

The family business founded by Franz Kreuzer is well-known and respected both in German speaking territories and in Scandinavia. Among other things, containers and apparatuses from C steel S235 through 13 CrMo to special stainless and specialty steels such as duplex or Hastelloy are produced at the company's location in Carinthia in the south of Austria.

Significant investments are expected in 2017, especially in the paper industry. K industries GmbH is looking forward to additional collaborations with satisfied customers.

Martin Kreuzer, COO of K industries

Three questions for Martin Kreuzer, COO and shareholder of K industries GmbH.

What sets Schoellershammer apart?
This company has class. The new PM6 makes them future-proof. I would like to extend my thanks to Schoellershammer for the trust they placed in us.

What makes your company different?
The reliability we have been offering our customers for over 30 years. Before as Kresta, now as K industries. With a proven team and the same contacts.

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Verlegte Leitungen

BILDNACHWEIS: VELTEC (ALLE BILDER)

EMSR INSTALLATION

300.000 M KABEL VERLEGT UND ÜBERPRÜFT

Das Unternehmen Schoellershammer beauftragte das Automationsteam der Firma Veltec am Standort Mainhausen mit der Montage der Elektro-, Mess-, Steuer- und Regelungstechnik (EMSR), dem Schaltschrankbau und der Inbetriebnahme. 40 Mitarbeiter haben in rund 28.000 Arbeitsstunden alle Arbeitsschritte zur Inbetriebnahme der neuen Papiermaschine PM6 umgesetzt.

Die Montage von Leitungen erfolgte im Kilometertakt

BILDNACHWEIS:

Die Teams führten die Installation der Kabeltassen, Verkabelung der Niederspannungsanlagen sowie der Feldbussysteme durch. Auch Montage, Verkabelung und Anschluss von MSR-Feldgeräten, Installation von Instrumentenluftverteilern, Remote I/O sowie Elektro- und Motoranschlüsse der neuen Papiermaschine im neuen Gebäude zählten zum Leistungsumfang.

Insgesamt verbaute Veltec über 300.000 Meter Kabel, über 8000 Meter Kabeltrassen und installierte rund 1500 messtechnische und auslösende Einrichtungen. Damit lässt sich die komplette Papiermaschine PM6 über elektrische Signale steuern und regeln.

Sämtliche Signale überprüfte das Team der Automation in sogenannten Signaltests. Dabei werden alle einzelnen Funktionen (Motoren, Pumpen, Stell-und Regelventile) und Messungen (Druck, Temperatur, Durchfluss) getestet:

Ist jedes Kabel richtig angeschlossen? Werden alle Signale korrekt an das Prozessleitsystem PCS7 weitergeleitet? Stimmen alle Meldungen, Grenzwerte und Alarme?

Letztere sind für die Anlagenfahrer wichtig, denn wenn ein Grenzwert überschritten wird, kann es zu Folgestörungen an der Papiermaschine kommen, die zum Produktionsausfall führen könnten.

Auch das umfassende Projektmanagement und die Unterstützung bei der Inbetriebnahme waren Bestandteil des Auftrages. Da verschiedene Gewerke zeitgleich mit Ihrer Arbeit starteten, mussten unterschiedliche Teams auf engem Raum sehr koordiniert zusammenarbeiten.

Waldemar Schombera, Sales Manager Automation und MES bei Veltec: „Wir haben bereits zahlreiche Automatisierungs- und EMSR-Montage-Projekte für Kunden unterschiedlicher Größen und verschiedenster Branchen umgesetzt. Innovative Lösungskonzepte und die kontinuierlich hohe Qualität unserer Dienstleistungen – dafür stehen wir."

Für die Kunden besteht der Vorteil darin, die fachgerechte Elektro- und MSR-Montage aus einer Hand zu bekommen – von der Planung, über das Engineering, bis zur Inbetriebnahme von Steuerungs- und Prozessleitsystemen.