

bulletin

DEC'19

Magazine of the Siempelkamp Group

Success

If there is any one secret of success,
it lies in the ability to get the other
person's point of view

(Henry Ford)



Siempelkamp

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Ladies and Gentlemen, Dear Siempelkamp customers and business partners,

At the end of 2019 and the beginning of 2020, I am pleased to send you the current issue of our bulletin.

“The secret to our success is understanding each other’s point of view,” is our catchphrase. For Siempelkamp I regard this motto as a central task – because it should always be a priority to understand your point of view and implement this understanding into our products and services. The ability to listen and to grasp needs precisely is part of our indispensable basic skillset. For this, a good, trusting exchange marks the beginning, and together with the Siempelkamp team I look forward to continuing this intensive dialogue with you.

This bulletin reports from many perspectives where and how we have achieved success together. Let us ensure that we will continue to write success stories in 2020.

I hope you and your teams enjoy reading this edition – and I wish you a good, successful 2020!

Christoph Michel,
CEO Siempelkamp Group



Interview with Siempelkamp CEO Christoph Michel

Personifying openness and dialogue



Christoph Michel took over the position as CEO of the Siempelkamp Group in January 2019, having been a member of the Management Board since August 2018. Time for a first résumé.



Mr. Michel, how did you perceive your first year at Siempelkamp?

Christoph Michel: The 12 months are not over yet, but I can say that this first year at Siempelkamp has been exciting for me. On the one hand, because I have met numerous people – e.g., many of our customers and employees from the entire network of the Siempelkamp Group. On the other hand, because the markets, partners and companies Siempelkamp interacts with are enormously different. From traditional companies to industry newcomers, from globally active wood-based panel producers to regional and international clients of our foundry – all of them shape our business equally. My respect goes to this versatility, and I do everything I can to solve the multifaceted tasks that this versatility entails.

On your travels and at important trade fairs you have established and deepened many customer contacts. What impressions have you gained here?

Christoph Michel: Indeed, I was on the road a lot right from the start, seeking an open dialogue with our customers and business partners. I want to understand their views and needs very precisely and also receive direct feedback. It has been very positive for me to see how long-lasting, close and trusting the relationship with our customers is that the Siempelkamp teams have built up over many years. For me, this is an important foundation. It's for a good reason that the title page of this bulletin contains the motto "The secret of success is to understand each other's point of view".

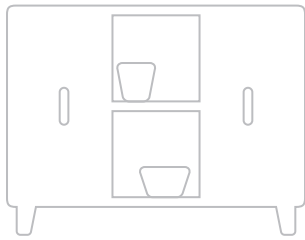
I was pleased to see how openly and positively I was received at the customer locations. Partly I received invitations to festive occasions, which were a special honor for me. They provided the opportunity for open discussions, which are indispensable between good partners.

What challenges do you see as the most important in our markets?

Christoph Michel: The international mechanical and plant engineering industry is currently navigating through rough waters, and some uncertainties are setting the tone in the global economy. These are the framework conditions. Together with the Siempelkamp teams at our national and international locations, it is now important for me to take the best possible countermeasures. The focus is on leading technologies, high quality standards for our products and services, forward-looking research and development, and the conviction that solid, trusting business relationships lead even through challenging times.

In your opinion, what is Siempelkamp's greatest strength?

Christoph Michel: I see two special resources: The first strength is the competence and loyalty of our employees, who are committed to the Siempelkamp Group worldwide. The second strength is our great willingness and openness to learn from our customers. After this first year at Siempelkamp, it will continue to be important to me personally to live this openness and learn from it.



Interview with Klaus Dahlem, Fabryki Mebli Forte

Excellent international teamwork!

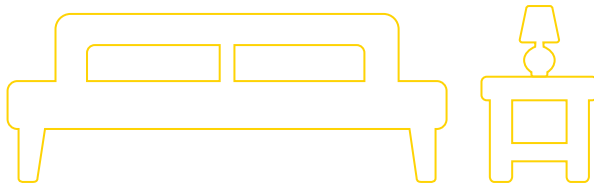
"Strong and powerful" is the meaning of "Forte", part of the name of one of the largest European furniture manufacturers. In 2016 Fabryki Mebli Forte ordered a particleboard plant from Siempelkamp, which was started up in Suwalki, Poland in 2018 – a strong and at the same time fast performance. On the occasion of this milestone, we spoke with Klaus Dahlem, member of the board at Fabryki Mebli Forte and responsible for investments, purchasing, technology, research and development.

by Christian Hassler / Jochen Dauter



Fabryki Mebli Forte is a respected and established furniture manufacturer based in Suwalki and four other locations. Why did you decide to produce your own raw material?

Klaus Dahlem: Forte in Poland is a listed company and one of the largest flatpack furniture manufacturers in Europe. We had several important reasons for investing in the construction of a particleboard plant. On the one hand, we want to ensure the future supply of materials to our four furniture factories in Poland. On the other hand, we now also have the means to manufacture exactly the products we need for the respective furniture production plants. This means that we can produce the required qualities for the required applications. We change the weight per unit area of the particleboards and optimize the dimensions of the boards to tailor them optimally to the required order. These were the decisive factors that prompted us to invest in our own particleboard production.



Fabryki Mebli Forte in Suwalki / Poland (plant from above)



Energy plant from Büttner

The planning and realization of a complete wood-based panel plant is a very extensive undertaking with great challenges. What were your considerations in the choice of a supplier for this investment – and what were the factors underpinning your decision afterwards?

Klaus Dahlem: First and foremost, Forte is a furniture manufacturer, as already mentioned. The decision to invest in our own particleboard production meant breaking new ground with many risks involved. To invest such a large sum as a newcomer was a great challenge for all of us. In Siempelkamp we found a competent partner who had already put their trust in us in this orientation phase. Siempelkamp supported us very much in the course of project planning for in the end, it was not only a decision about technology and its price, but also a question of mutual trust. >

The wood-based panel plant was started up extremely quickly. What was your impression of the cooperation between the Forte and Siempelkamp assembly teams in the assembly phase and during startup?

Klaus Dahlem: On completion of project planning we started assembling the plant in the middle of winter – and completed the entire project very fast. In some areas this was a record-breaking achievement and, of course, only possible in perfect cooperation. There was excellent cooperation between the local construction companies and all the persons who managed everything on a daily basis. I can still remember very well a cold day, minus 20° C: nobody ever thought of closing down the site, everybody carried on. This was only possible because the international cooperation worked so well. We didn't have any problems with the different languages either, sometimes there were interpreters present, and we had such a great time despite the hard work.



ContiRoll® press



Büttner dryer for Forte

You require certain material particleboard qualities for your furniture factory in order to meet the high quality requirements. How long did it take to stabilize and optimize the plant to ensure these requirements in flawless shift production?

Klaus Dahlem: After pressing the start button, I think it still took us some months to really get familiarized with the system, to develop a safety scheme and to detect hidden faults. Our employees were newcomers who had never worked in particleboard production before, so it took a certain amount of time before we were able to manage the settings in a targeted manner in order to handle the different board qualities.

Hardly a day goes without us gaining new experience. There's also a big challenge in reducing the amount of raw materials for the different product qualities as well as the panel emissions. We have already learned a lot here, but this is an ongoing process that is being optimized again and again to perfection – and we do appreciate our partners at Siempelkamp supporting us in every way.



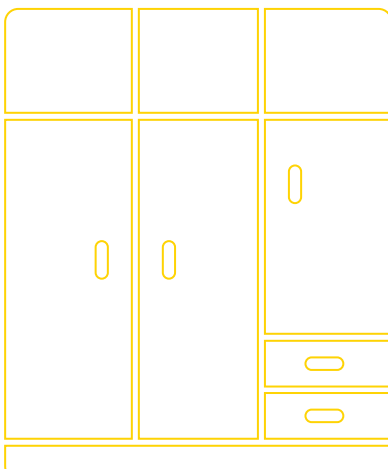
In addition to Suwałki, Forte manufactures at four other locations, in Ostrów, Mazowiecka, Białystok and Hajnówka. What made you go for Suwałki to be the site for your raw material production?

Klaus Dahlem: There were several reasons for choosing Suwałki. At first, we had other possible locations in our sights, but one of the biggest customers is our local furniture factory here, about 10 km away from this board factory. Another reason, of course, was the area rich in commercial forests as we are on the outskirts of Masuria. There are very large forests in three adjoining countries, Poland, Lithuania and Belarus.

In retrospect: Finally, can you name some outstanding points from the cooperation that have made a lasting impression on you? Were there outstanding personalities in the Siempelkamp team who, in your opinion, gave the whole project momentum?

Klaus Dahlem: Of course there are outstanding personalities, but it would be wrong to name just a few now because you might forget to name the many project members who played decisive parts in this project. It was the entire team that always accompanied us through the whole process. The fact that new friends were made here, is an indicative of the quality of the overall team performance.

Cooling turner



★ ★ ★
A record story

47 meters for Dongwha

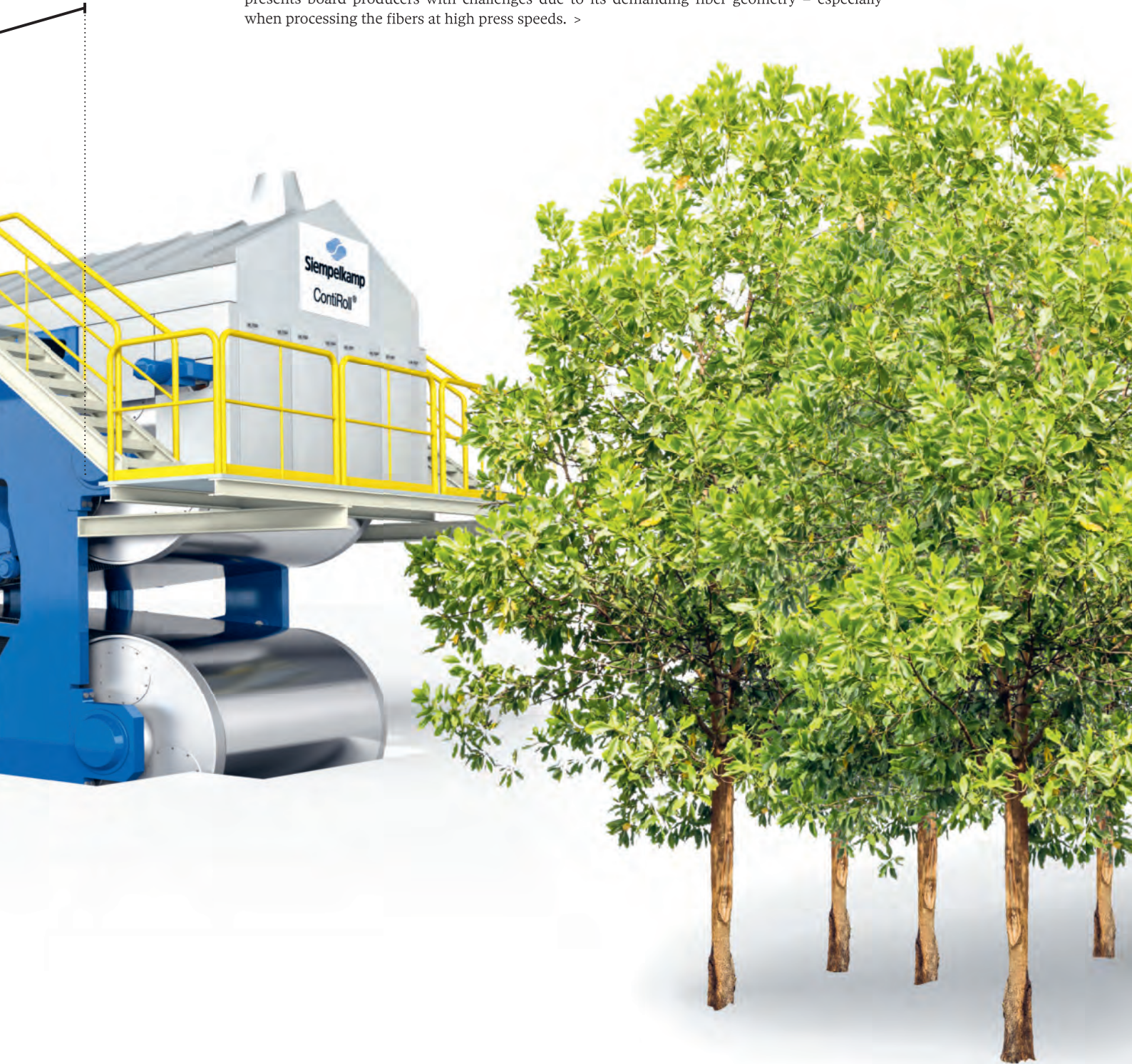


With another 8' × 47.1 m press, the Korean company Dongwha, Asia's largest producer of wood-based materials, has become, for the second time, the record holder of the "longest MDF press in Asia". The focus of the new, third, Siempelkamp plant in Vietnam is on the processing of the challenging wood species acacia.

by Marc Müller

The company VRG Dongwha, a joint venture between Dongwha International and the Vietnam Rubber Group (VRG), had already ordered two MDF plants from Siempelkamp in 2010 and 2015. Both plants operate in South Vietnam in the greater Saigon area and serve the country's continuously growing wood-based products market.

The additional investment in a third Siempelkamp plant is solely made by Dongwha International in order to make usage of the specific resources in Northern Vietnam in the greater Hanoi area. Here acacia is considered one of the most widespread wood species, but the raw material presents board producers with challenges due to its demanding fiber geometry – especially when processing the fibers at high press speeds. >





Team "Dongwha" with Project Director Dongman Shin (third from right). Second from the right: Marc Müller, Area Sales Director Wood Division Siempelkamp, fourth from the right: Jörg Melin, Sales Manager Büttner Energie- und Trocknungstechnik GmbH.

ContiRoll® Generation 9 NEO: Best reference for visionary projects

Siempelkamp's technology, which focuses on processing the most challenging raw materials, is a central cornerstone of the renewed cooperation: With the ContiRoll® Generation 9 NEO (= New Entry Option) Siempelkamp developed a continuous press with an extended, highly flexible press infeed that ensures controlled deaeration of the mat – important for reliable process stability at high production speeds, particularly with challenging fiber geometries. The innovative press concept of the ContiRoll® Generation 9 NEO, the many years of experience in processing acacia and the good cooperation during the last projects were important factors in Dongwha's decision making process. "We are proud to once again support our Korean partner with a tailor-made solution to expand its market-leading position," says Marc Müller, Area Sales Director Wood Division Siempelkamp.

In addition to the forming and press line, the board handling technology and a glue kitchen adapted to the raw material acacia, the scope of supply also includes a dryer and an energy system from the Siempelkamp subsidiary Büttner. After the groundbreaking ceremony at the beginning of December 2019, the delivery and assembly works will start in the third quarter of 2020. Commissioning is scheduled for the late summer of 2021.



Acacia: Asia's all-rounder

Acacia mangium is deemed one of the most widespread wood species in Asia and the Pacific region. Acacia mangium helps to combat deforestation and, as a fast-growing wood species, offers in many plantations new options for the engineered wood industry. Acacia is regarded as a "soil improver" and paves the way for more demanding tree species that are not sufficiently supplied with nutrients on heavily depleted soils. Acacia trees improve soil quality by filtering pollutants and enriching the soil with nitrogen. They reach heights of up to 35 meters and trunk diameters of 90 centimeters. Acacia wood is robust, flexible and resistant, making it attractive for both the furniture industry and terrace construction.

Source: <https://blog.forestfinance.de>

3 questions for Dr. Michael Schöler, Head of the Siempelkamp Research and Development Center

Dr. Schöler, when did the Siempelkamp Research and Development Center start focusing on the processing of acacia wood?

Dr. Michael Schöler: Siempelkamp Research and Development has been working on the use of Acacia Mangium for wood-based panel production since 1988. Our focus was and still is on the production of MDF, for which we have gained solid expertise during this period.

What exactly are the challenges of this wood – and how have the Siempelkamp technologists mastered these challenges?

Dr. Michael Schöler: The special fiber geometry of acacia requires special technologies, which we supply in particular with the extended infeed of the ContiRoll® Generation 9 NEO. This new infeed makes it possible to deaerate the "difficult" fibers well and prevent blowouts. On the basis of our research and development, we are thus in a position to produce attractive and high-quality MDF panels.

For which customer requirements and applications is the pressing of acacia wood ideal?

Dr. Michael Schöler: Since most acacia wood comes from plantations, industrial processing into wood-based materials such as MDF or chipboard is an ideal option. If acacia is used in MDF boards, it can also be combined with other wood species of similar density.

Rice Straw Plant for CalAg LLC

Vision for the wood-based panel industry, benefit for climate protection

Panel producers and the wood-based panel industry are facing far-reaching change processes: What will the board of the future look like if you think ahead to the challenges that limited resources and climate protection create? To what extent do annual plants open up alternatives? Together with the American company CalAg, LLC / CalPlant I, LLC, Siempelkamp has been breaking new ground for years – now research and development is followed by the first project!

by Roland Peltzer / Dr. Jochem Berns

A win-win situation in multiple ways is the contract Siempelkamp received in June 2017: The American CalPlant I, LLC ordered a production line for fiberboard from rice straw for the use of annual plants including a Generation 9 ContiRoll®.

This project is regarded as a milestone for the economic use of a raw material that would otherwise remain unused as a waste product: Rice straw is available in North America in very large quantities; in the USA approx. 10,000,000 metric tons of rice is cultivated annually. This makes the United States one of the 20 largest rice producers in the world. The main growing areas are in Arkansas, California, Louisiana, Texas and Mississippi. >



CalAg plant in November 2019



Wet rice cultivation and the consequences: a process with many facets

In Northern California, mainly classic wet rice is cultivated, which achieves premium qualities compared to those of sushi rice due to the optimal soil and weather conditions. This is also an advantage from a business point of view: while selling one ton of rice in standard quality yields approx. 100 dollars, the same quantity in sushi quality generates six times the sales amount!

Hence, insofar the best prospects for wet rice cultivation in California apply, if only the region would not be considered a water shortage area. California banned the burning of straw after the annual harvest. And due to continuing droughts, the administration of the West Coast state decided a few years ago to impose water-saving measures. These also had an impact on wet rice cultivation. The 4-month rice growing process is dependent on a constant flow of water: Fields are flooded before the rice can be planted. Later, the water is drained, the fields dry and the rice is harvested. After burning was banned, the common process is to chop the remaining straw and leave it in the fields. A second water filling is then required to allow the chopped straw to rot. However, during drought years this second water filling has been banned in California. In this respect, CalAg's focus was on exploring other options in order to use the straw sensibly and adequately from the point of view of resource efficiency. The nearly year-round watering of the soil also has a negative effect on the earth's atmosphere: This creates an almost oxygen-free habitat for anaerobic methane producers.

On this basis, the vision was born to develop a plant for the use of annual rice straw, which was fed by numerous advantages. On the one hand, the raw material solves many of the problems caused by the shortage of wood – on the other hand, many countries do not even have the amount of wood necessary for industrial use. In addition, the use of rice straw in panel production considerably enhances the value of the raw material.

CalAg began its research and development of using rice straw as a raw material for the production of MDF in 1996; Siempelkamp began to assist their R&D effort in 2009. The project finally achieved financial closing in 2017 and the plant, which is the first of its kind, is expected to start up in late 2019. Siempelkamp planned, designed and supplied the entire machine technology for the Willows, CA site – including commissioning. CalPlant CEO Jerry Uhland announced that the plant will significantly reduce water consumption for flooding rice fields in the Sacramento Valley. The project will create 115 full-time and over 500 part-time jobs during the straw collection period.

Technological concept

In the area of production – e.g. mat-forming machines, forming and press lines – the production process is comparable to that of traditional wood-based MDF production. The straw preparation, on the other hand, requires specific adjustments. The quality of the board is considered to be at least equivalent to that achieved with standard wood-based boards.

Specifically, the differences in the production process relate to the preparation, handling and processing of the straw. They have three main effects.

1 Separation/sifting – and the special challenges of silicates

Amorphous silicates from the water and soil are absorbed by the rice plant in a much higher concentration than crystalline silicates by wood. Their chemical composition is complex, and some silicates are almost insoluble in water. Since plants absorb the soil components, they also uptake the silicates – mainly in the form of less abrasive amorphous silicate.

Siempelkamp has developed a special cleaning device to ensure that rice straw MDF can be used in the same way as commercially available wood-based MDF. When the rice straw is shredded, not only the chopped material, but also dust and fines are produced. One of the significant advantages of this process is that foreign matter in the product is minimized, which means that the tool life during further processing is longer, as the emery effect is reduced by separating the dust and fine material.

2 Resin blending system – fine material at a glance

Siempelkamp developed a special mechanical resin blending system for the CalAg mill and the processing of rice straw into boards. Californian environmental regulations also stipulate that boards must be produced with low formaldehyde content. The Siempelkamp blending system uses polymeric methylene diphenyl diisocyanate (pMDI), a formaldehyde-free adhesive, as a binder. Straw materials are ideal for pMDI gluing. This makes the CalAg mill particularly environmentally friendly, as no added formaldehyde has to be removed in the dryer emissions.

3 Pallmann refiner for annual plants

The CalPlant project includes refining equipment for defibration of the rice straw, developed by Siempelkamp subsidiary Pallmann, including machines typical for annual plants.

Natural gas serves as an energy source for steam generation and for the dryer, supplied by Siempelkamp's subsidiary Büttner. The flue gases from the steam generators are used as a component of the dryer air. All exhaust gases are passed through a wet electrostatic precipitator. The lower efficiency for formaldehyde is irrelevant in the context of the CalPlant project because the product is free from added formaldehyde.

CalPlant = Zero Emission?

The question as to whether the rating “Zero Emission” can be assigned to CalAg can be answered with “Yes” in essential aspects. A central goal of “Zero Emission” is to keep the plant free of waste water. This is implemented in the CalAg concept. And: The only fuel used is natural gas burnt in low NOX-burners, not biomass.

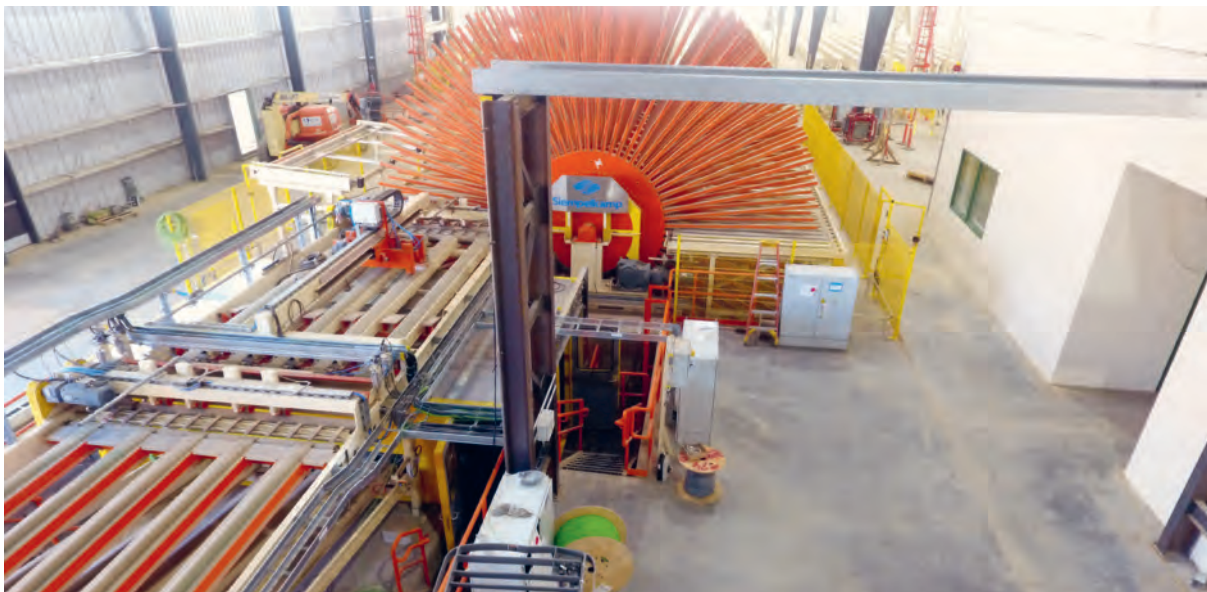
The CalPlant project marks the beginning of a new era for what has been a waste product that had been burned in the fields for over a century in California. CalPlant’s annual

output will be approximately 250,000 m of rice straw-based fiberboards, in a thickness range of 2 to 30 mm.

In summary, this project represents an ideal symbiosis of experience and innovative strength: engineering expertise, complete plant competence and the leading ContiRoll® technology on the one hand – a new separation concept and a resin blending system specially tailored to the raw material on the other.



CalAg inside view, production line




SYNER

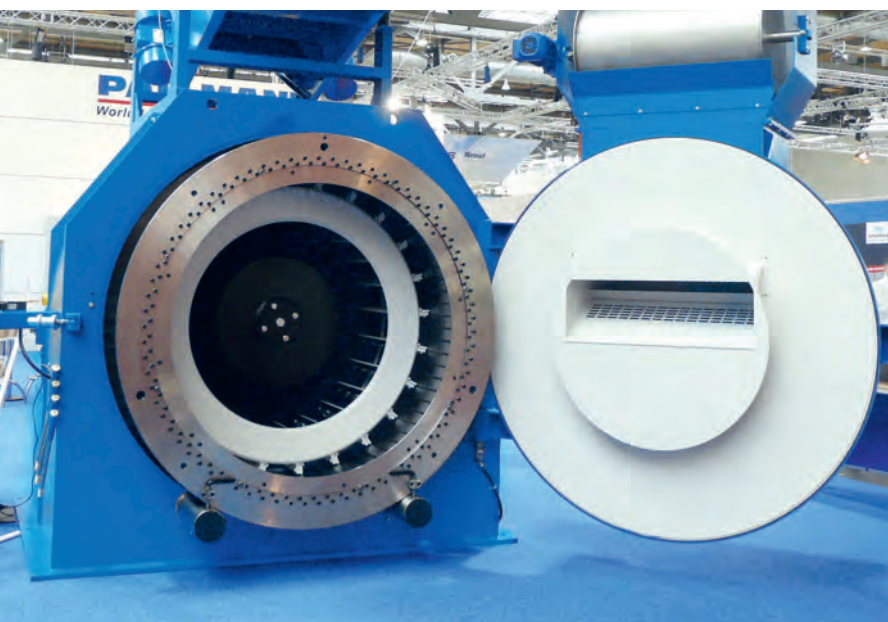


**Strothmann's RoundTrack[®]
meets PALLMANN's knife ring**

by Lutz Bussmann / Milomir Mihailovic / Ulrich Kaiser



Premiere for Strothmann Machines & Handling GmbH and Pallmann Maschinenfabrik GmbH & Co. KG, both subsidiaries of the Siempelkamp Group: Klaipedos Mediena (VMG) is the first wood-based materials producer in Lithuania to order the combination “RoundTrack®+ knife ring”. This alone is reason enough to take a closer look at this innovation of the handling and automation specialist Strothmann for the wood-based materials industry.



Opened knife ring flaker by Pallmann



Lutz Bussmann, Strothmann Sales Director, explains a RoundTrack® cart that moves weights of up to 80 metric tons fully automatically in the American aircraft industry

The core competence of Strothmann Machines & Handling GmbH, located in Schloß Holte-Stukenbrock, are handling and automation solutions; the company's RoundTrack® systems provide measurable efficiency advantages for numerous applications. The customer portfolio ranges from the automotive, materials, wind power and aircraft industries to manufacturers of construction modules and the food industry. Recently, large projects for the fully automated assembly of agricultural machinery have been won in agricultural engineering. The technology enables productive and efficient flow or pulse assembly and intralogistics.

Thanks to its minimal rolling resistance, the RoundTrack® moves loads weighing tons with high precision; up to 5000 kg can be moved manually by one person. The solutions range from manually pushed carts to fully automated, driverless transport systems (AGVs). Strothmann supplies complete systems including the control for driven carts and state-of-the-art safety technology.

The subject of the current cooperation between Siempelkamp, Strothmann and Pallmann is a RoundTrack® carriage, which, starting 2021, will move knife rings between the Pallmann knife ring flakers and the setting and sharpening robot in one of the most modern particleboard factories in Europe. This scope of supply is part of the third complete Siempelkamp plant for Klaipėdos Mediena (VMG) in Lithuania. The plant planned for the Akmene site will go into operation in 2020 as Europe's most modern particleboard production plant with trend-setting technology.

Knife-sharp coup: more safety, more speed

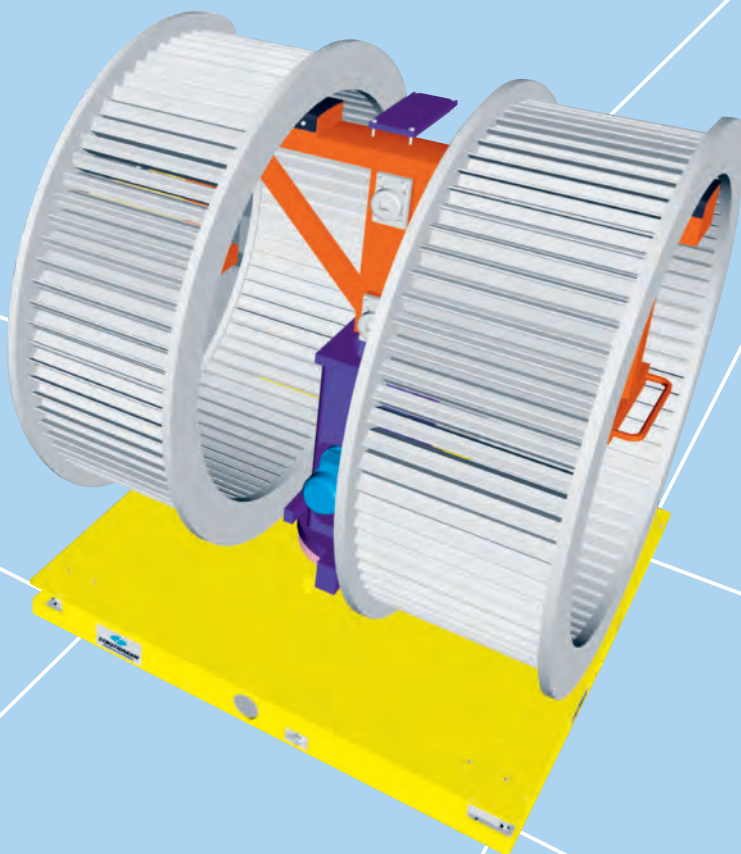
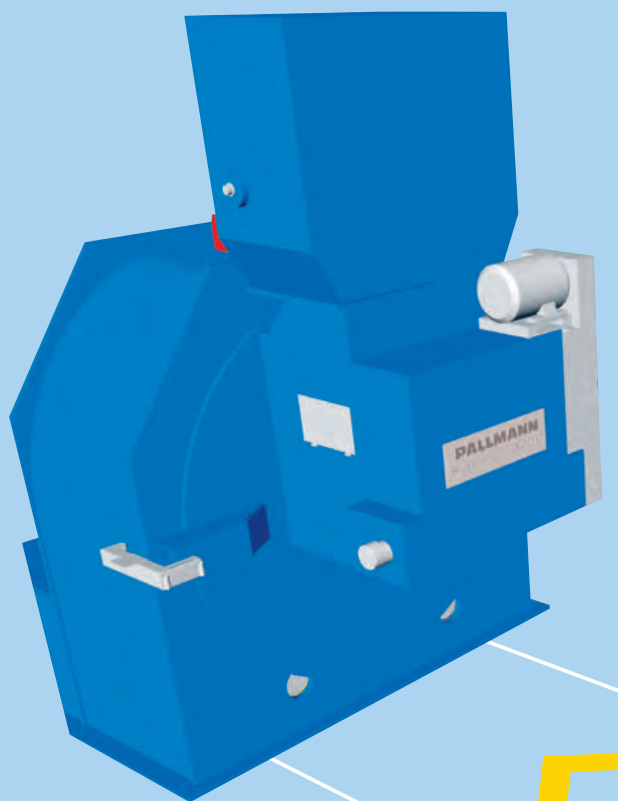
RoundTrack® meets knife ring – what exactly is the customer benefit? On the one hand, the use of the Strothmann concept stands for more safety, because large knife rings weighing approx. two metric tons can be transported more safely on the RoundTrack® than on a trolley. The Pallmann knife ring itself is already an advantage – in order to machine efficiently and with high performance in the plant, king size flakers à la Pallmann are an enormous advantage. “We reduce the number of machines, require less feed and discharge technology and silo buffer volume in the overall concept, require fewer installed motor power in the factory compared to standard flakers – this convinces our customers,” says Ulrich Kaiser, Area Sales Director Wood Division Siempelkamp, summing up the advantages.

A further significant customer advantage comes into play when changing the knife ring: Routine knife ring changes are scheduled approximately every eight hours, which can take between 20 and 40 minutes for a conventional change – valuable time in which the machine does not produce. Here, the RoundTrack® cart pays off as a “quick-change unit”: The cart is positioned in front of the machine during the change, the lifting device on the cart lifts the blunt ring, the lifting beam is rotated 180 degrees on the RoundTrack® cart and feeds the new, already loaded ring without having to travel a longer distance. Gone are the days when the old ring was removed by means of a lift truck and manually moved to the side, and a second lift truck moved the new ring forward and placed it in the machine.

On the way to the Factory 4.0: "Go, RoundTrack®"

With the new solution thanks to the Pallmann-Strothmann concept, the Factory 4.0 is a step closer. The system at VMG is operated completely manually. In a future step it is conceivable to implement full automation. This means: the Pallmann machine triggers the knife ring change and calls the change cart.

Not only the process, but also the fields of application for the RoundTrack® are setting a new course. In addition to shredding technology, there are attractive application options, e.g. in the area of finishing lines, for maintenance purposes during gluing and in the area of board finishing. "It is confirmed that there is great potential for using the RoundTrack® in the wood-based panel industry," says Lutz Bussmann, Sales Director at Strothmann. Egger in Brilon uses a RoundTrack® 60 on which the panel distribution carts are automatically moved for feeding short-cycle presses with a payload of up to 90 metric tons. Another RoundTrack® 40 has been installed at Egger's Rambervillers plant in France. For the resin blending systems at the Siempelkamp rice straw plant for CalAg in the USA, Strothmann contributed a RoundTrack® system with change carts.



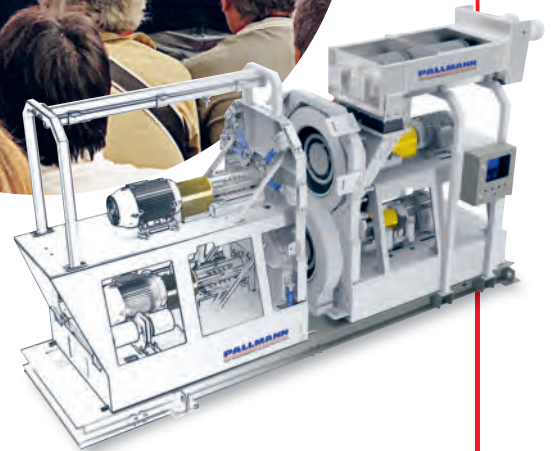
3-D view of the system which uses Pallmann and Strothmann technology together for the first time: RoundTrack® cart that moves Pallmann knife rings

EcoPulser at Expobiomasa

Innovation Award 2019!

by Carlos Gómez

Success message: In September, the international Bioenergy fair Expobiomasa has awarded the 2019 Innovation Award to Siempelkamp subsidiary Pallmann. The EcoPulser technology, which crushes wood using shock waves, is worthy of an award. The concept is also gaining acceptance on the market.



The Expobiomasa in Valladolid / Spain is regarded as a jour-fixe for companies that deal with the use of biomass as an energy source. Of course, the Pallmann concept "EcoPulser" found a suitable forum here.

With its unique functional principle, the EcoPulser adds an important innovation to the Pallmann shredding technology range. The EcoPulser is a mill that does not crush with mechanical contact, but it does so through "shock waves" which are generated by two revolving rotors. This new system saves up to 80% in energy costs compared to conventional mills such as hammer mills, flakers or similar machines. "Thus, significant reductions in pay-back times are now feasible, i.e. in some cases a Return on Investment in about only 8 months can be realized by customers", says Carlos Gómez, head of Pallmann Ibérica.

More detailed: The EcoPulser can crush approx. 5 MT/h (atro) of wood chips with only 2 engines of 22 kW each. Having no mechanical contact, maintenance costs between stops, wear parts, etc. can be reduced by up to 30 %. In addition, it does not generate wood dust during crushing, so it does not generate an ATEX zone and the extraction system can be of a much reduced design, consequently saving energy, too. Finally, in the case of recycled wood, the shock waves only crush the wood, but not other contaminating elements such as plastics or metals (ferrous or non-ferrous), without these affecting the rotors of the EcoPulser when passing through it. Therefore, the final material can obtain a better separation and an improved final cleaning.

Technological lead perfectly meets customer needs: The Spanish particle board manufacturer Financiera Maderera S.A. (FINSA) has just ordered this innovative and efficient size reduction technology. During the LIGNA 2019 trade fair the project was discussed in detail and finalized in July: FINSA ordered two EcoPulser Twin, each equipped with two pairs of rotors. The Twin-version achieves a throughput rate of approximately 10 MT/h (atro) and it will be used by FINSA with dry material (i.e. for getting a higher percentage of particleboard surface layer). The second EcoPulser Twin will be used by FINSA for the processing of waste wood with a moisture content of approximately 30 %.

EcoPulser – clever technology for pellet or wood chip production

The production of pellets or biomass as fuel for energy generation, has a significant disadvantage, as more than 50 % of its total production costs stem from energy costs. While true, it still sounds like a paradox that it costs us a lot of energy to produce something that then has to provide a "green energy", right?

The EcoPulser is an alternative and revolutionary technology compared to current grinding systems in pellet manufacturing processes or when obtaining wood chips to be burned in biomass boilers. In addition, its application in the case of recycled wood is a revolution since customers can obtain an even greater purity of the final product without the need of a rather complex separation system. Metals and plastics are not crushed and can be separated much better, significantly reducing the level of contamination of the final product.

Potential customers are producers of wood panel products, pellets, briquettes, flakes or chips for power plants and all wood recyclers.

The image shows the exterior of a Fermacell building. A large orange sign with the word "fermacell" in white lowercase letters is mounted above the entrance. The entrance features a pair of orange-framed double doors with glass panels. To the left of the doors is a large, rounded green bush. To the right is a brick wall with a small window and a blue fire extinguisher. A paved area with grey bricks leads to the entrance. The building's upper part has light blue corrugated metal siding with two small vents.

fermacell®

Full scope of service for Fermacell

Concentrated teamwork for top-notch results

by Markus Lisges

Sound planning, well-coordinated teamwork, reliable project implementation: Siempelkamp Logistics & Service GmbH (SLS) convinces its customers with these principles. A prime example of the successful concept is the modernization of a mobile gypsum fiber press at Fermacell in the Netherlands.

Fermacell, manufacturer of gypsum fiberboard, has relied on Siempelkamp's expertise since the 1980s. Its mobile gypsum fiber press, commissioned in 1994, is "made in Krefeld". For a long time, the plant at the Wijchen site in the Netherlands operated continuously without any problems. Over time, however, production-related difficulties arose. The necessary repairs resulted in increasingly high production losses. At this point it became a case for SLS, the Siempelkamp service specialist.

"At first only spare parts were discussed, but during the project it became clear that a general overhaul was more economically sensible," recalls Markus Lisges, project manager at SLS. Accordingly, SLS designed the upgrade for the Fermacell press as a complete solution from technical consulting to commissioning.

Project premise: As little downtime as possible

The timeframe for the project: eight weeks. "That required a tough program," says Markus Lisges, "with ultimately hundreds of hours of planning and coordination. The concrete task for SLS was to replace various large parts of the press and modernize the press hydraulics with new hydraulic components. This included the complete dismantling of the old components and the assembly of the replacement parts including the hydraulics.

The fact that this very tight time window for the conversion could be kept was not least due to the know-how of SLS and KS (Kurt Schuhmacher Industriemontagen) – and the optimal teamwork between all participants. While the project managers at Fermacell initially assumed that the hall roof would have to

be removed for dismantling and reassembly, SLS and KS had a better solution in terms of time and cost: a compact special crane capable of handling heavy payloads. This made it possible to replace the press without having to make any structural changes to the hall.



Markus Lisges
Responsible project manager
Siempelkamp Logistics & Service GmbH

Instead, the existing plant components were disconnected, drained of oil, the oil tanks dismantled, the crane moved into the hall, the existing large press components detached, completely removed with the crane and transported out. Fermacell and SLS were able to concentrate jointly on the preparation and measurement of the production axes without having to make changes to the hall construction.

Everything according to plan in terms of logistics

The original concept was to temporarily store the new press components at Fermacell for four weeks – including additional costs and

work. SLS's solution: its logistics team organized that the complete hydraulic system was transported to Krefeld immediately after dismantling. A general overhaul including new wiring of the electrical system as well as pre-commissioning and tests followed at Siempelkamp Maschinenfabrik. Following the successful test runs, SLS delivered the hydraulic unit back to Wijchen "just in time", as SLS project manager Markus Lisges explains. SLS was able to schedule the heavy transport so that the parts were transported overnight from Krefeld to the Netherlands and delivered directly from the truck to the plant for assembly – interim storage was not necessary. This meant that the new and overhauled large press parts could be reassembled immediately.

Classical commissioning problems also did not affect the schedule. Daily meetings of the managers of Fermacell and SLS/KS ensured immediate coordination and short-term solutions. "If you need three hydraulic 90° angles and have only one angle, it might seem trivial, but a solution has to be found,"

illustrates Markus Lisges. In this situation the customer reacted excellently by letting the SLS fitters take these missing parts from the company's warehouse. "No matter how, the main thing is that the customer gets what it needs as quickly as possible," he emphasizes.

The end results for Fermacell included: production resumed by the scheduled date. The project was successfully completed.



**“A sporting project, top organization by SLS.”
Interview with Jos Kraaijkamp,
project manager at Fermacell**



The reconditioned press

In terms of time, the “gypsum fiber press” project was a precision landing. Did it go as planned in every other respect?

Jos Kraaijkamp: Yes, everything went well. We stayed on schedule and within budget and we really liked the cooperation with SLS. All in all, it was a sporting project for everyone involved, but the new press started on time – despite all the challenges.

Speaking of which, in your opinion, what were the biggest challenges in implementing the project?

Jos Kraaijkamp: The bottom line was that everything went perfectly, but there were some challenges: The assembly in the hall alone using the special crane and the schedule of only eight weeks for the conversion were challenges. Actually, a longer timeline for the conversion was planned at the beginning. However, this would have meant longer downtimes for us, which we wanted to avoid. That’s why we went back to the planning stage together with Siempelkamp and were able to schedule the conversion with an eight week completion interval.

So did the project schedule meet your expectations overall?

Jos Kraaijkamp: Yes, it did. Such a large project must, of course, be managed continuously. For example, there was a meeting every evening between the project management of our company, the installation management of SLS and

the responsible KS fitters to discuss the current status. In this way, we were able to react to short-term problems, which always arise during a project of this magnitude.

What added value does the new press have for you?

Jos Kraaijkamp: The decisive reason for the conversion is that we expect fewer malfunctions and unplanned downtimes in the long run. For this reason, we decided to replace the old press 1:1 with a new cycle press. However, the frame now has a new shape and the entire calculation is of course based on the latest technology. That alone will bring improvements. These will become evident over time.

If you had to describe the cooperation with SLS with a term, what would that be and why?

Jos Kraaijkamp: What I particularly like is the great flexibility of SLS. Here is an example: During planning we had gained almost one full week. In order not to lose this extra time, the heavy parts had to come earlier than originally planned. The problem was that this could only be done via a heavy transport and special permits were required for this. The organization of these permits and the transports by SLS were first-class and the time gained was thus retained. We are already planning future projects with SLS. And as a customer, you only do that if you are satisfied.

„Hayırlı olsun“
Good luck!

Congratulations to the Turkish wood-based panel producer AGT, whose second MDF plant made by Siempelkamp reached the important “First Board”-milestone on September 19, 2019.

by Ulrich Kaiser

The AGT owner family, the management and the entire workforce came together to celebrate the First-Board-event. A Siempelkamp delegation together with Ulrich Kaiser, Area Sales Director Wood Division, travelled from Germany to experience this important project success together with the Turkish customer and the Siempelkamp start-up experts – five years after the first board was pressed on the first MDF plant that AGT had ordered from Siempelkamp. “This was a special occasion for Siempelkamp’s Sales and numerous other departments, which worked hand-in-hand with the AGT team during the consulting, planning, design, assembly and commissioning phases,” said Ulrich Kaiser.

The scope of supply contains a Generation 9, 7 ft × 55.3 m, ContiRoll® press, featuring the low density panel package, the forming and press line, and the glue kitchen with the innovative Ecoresinator resin blending and appli-



Mehmet Semih Söylemez, AGT Board Member, Ulrich Kaiser, Area Sales Director Wood Division Siempelkamp



First board at AGT with Mehmet Semih Söylemez, AGT Board Member and Sevdil Yıldırım, General Manager of AGT (center, both in front)

cation system for MDF. Also included: the EcoSifter, a cooling and stacking line as well as a masterboard sanding and cut-to-size line with the associated intralogistics for downstream board finishing. The order volume also includes a fiber dryer and an energy system from Siempelkamp's subsidiary Büttner. The connection with the first MDF line made by Siempelkamp opens up numerous advantages and focuses primarily on resource efficiency. The plant is designed for a daily output of more than 1,000 m³; the boards are produced especially for export.

Visionary entrepreneurship

Ordered at the beginning of 2018, this project underlines AGT's commitment to visionary entrepreneurship with which Mehmet Söyle-

mez leads the family business into the future. "There are various companies worldwide that manufacture presses. Siempelkamp supplies the ContiRoll® press as the heart of a production plant, but the overall concept of such a wood-based materials plant is most relevant when it comes to the subject of 'performance'. Siempelkamp is able to supply the best concept from a single source – from the woodyard to the value-added processes," said Mehmet Söylemez during an interview at LIGNA 2019, confirming his company's commitment to Siempelkamp.

On the occasion of the jointly celebrated First Board, the solidarity between the two companies was once again demonstrated – because Siempelkamp also lives the values of a family business, combined with the permanent drive

to take the decisive step ahead in the market.

"The location of AGT in Antalya with now two ContiRoll® presses, each with a length of 55 m, will certainly develop in record time to another mega production site in Turkey, which allows not only the raw board production but also the finished board production under a single roof. Many international customers have visited the AGT site together with Siempelkamp in the recent years and have intensively exchanged ideas with the owners and experts on site. The further expansion of the location will certainly be a magnet for many interested parties from near and far," concludes Ulrich Kaiser.

Gala stage with business partners



Gift for Siempelkamp:
Haluk Yıldız, CEO Kastamonu Entegre, and
Ulrich Kaiser, Area Sales Director Wood Division Siempelkamp



50 Years Kastamonu Entegre

Trust, Friendship, Future

by Ulrich Kaiser

In the year of the moon landing in 1969, a Turkish company also started its mission to conquer new worlds: Kastamonu Entegre, one of the largest manufacturers of MDF, particle-board and laminate flooring in Europe, began its business activities. Today, the company has become one of the world's leading producers of wood-based products: currently No. 7 in the world, No. 4 in Europe, No. 1 in Turkey. Siempelkamp felt honored to celebrate this milestone in October.



Handover of a Mini-ContiRoll® f.l.t.r. Nilgün Binbay (Siempelkamp), Jörg Melin (Büttner), Ulrich Kaiser (Area Sales Director Wood Division Siempelkamp), Yahya Ki il, Chairman of the Board at Kastamonu, Heinz Classen (former Managing Director Siempelkamp Maschinen- und Anlagenbau GmbH), Abdullah Tuz (Bingöl Dealer)

Kastamonu Entegre in numbers

Founded in **1969** as part of the HAYAT holding company
11 locations in **6** countries

1.35 billion USD

5.5 million m³ annual production of wood panels

70 million m² annual production of laminate flooring

6,300 employees

A gala with 1,200 invited guests from politics and industry, suppliers and customers provided the festive setting for the anniversary. A Siempelkamp delegation was also on site to celebrate with the long-standing customer. Management, sales, assembly and service teams and many other interfaces between the two companies are closely linked. And this over the entire time since Kastamonu Entegre was founded: in 1969 the company ordered a complete belt-tray plant for particleboard production for its Kastamonu site, a second plant was ordered in 1975. The Turkish company currently operates eight Siempelkamp plants with continuous press technology in Turkey, Russia and Italy.

Following the two belt-tray plants from the early years, the first Küsters press for MDF production for the Kastamonu site in Gebze in 1993, regarded as a pioneering press in Turkey, represents a milestone. Later, ContiRoll® presses made by Siempelkamp for MDF and particleboard production followed every two to three years. The highlight is the still largest MDF/HDF plant in Russia with a 9' x 55 m Conti-Roll®, which Kastamonu ordered for its Alabuga site in Tatarstan in 2013. This plant was the first investment step at this new site, where Kastamonu operates an MDF/HDF and laminate flooring plant.

Kastamonu has been continuously developing new markets and locations for 50 years and Siempelkamp has been working closely with its Turkish partner ever since. This long-standing business relationship led to friendships – and so it was an honor for the current and former Siempelkamp representatives to be invited to the big Kastamonu gala in October 2019. This also included Heinz Classen, former Managing Director of Siempelkamp Maschinen- und Anlagenbau GmbH, and Michael P. Krockner, whose company GIM Export Group worked shoulder to shoulder with Siempelkamp on many successful projects with Turkish customers.

Conclusion: Celebrating together always stabilizes the connection between partners and reminds us how valuable such long-term and trusting cooperations are. The entire Siempelkamp team wishes Kastamonu every success for the future and expresses thanks to the company for the confidence it has placed in us for four and a half decades.



Exhibition team at the GIM Export booth



Siempelkamp team with Panel Plus team – far left: Mirza Reza Pooya, Director Water World Investments, fourth from right: Amporn Kanjanakumnerd, CEO Panel Plus, far right Vorapong Ratanapruekskul, Deputy Vice President Panel Plus

Excursus Intermob

See you there!

From October 10 to 14, 2019 a Siempelkamp delegation had another event to attend in Turkey: Intermob, the international trade fair for the furniture production industry, which takes place annually in Istanbul. As one of the industry's most prominent trade fairs, it attracts trade visitors from all over the world.

“We have been supplying at least one ContiRoll® per year to Turkish wood-based panel producers for about two decades. We are proud of this – and the discussions with our partners in Turkey about existing plants and new investments are a fixed and welcome part of our annual calendar”, says Ulrich Kaiser, Area Sales Director Wood Division Siempelkamp. Our photos show some impressions of this year's Intermob.

Further events in Turkey are planned. A preview: The successful Siempelkamp Symposium, which took place in Istanbul in 2018 with great response, will be repeated in 2020 and will entice with completely new topics ...

SLS customer survey 2019

From satisfied to very satisfied!

What do we do right, where can we further improve? Direct customer feedback provides the best answers to these important questions for any company. That is why the Siempelkamp subsidiary SLS also launched a worldwide customer survey in 2019.

by Dr. Stephan Niggeschmidt / Carmen Lorch

The response shows a gratifying result:
SLS customers are largely satisfied to
very satisfied with the performance of SLS:

83%

with the know-how of
the technicians

84%

with advice on
spare parts

86%

with the accuracy of
the spare parts deliveries

91%

with the quality of
our parts

"ServiceNet" and digitalization

The survey also highlighted the relevance of the digitalization issue, to which 75 % of respondents attach great importance for their business. "This is confirmed by our Service 4.0 concept, with which we prepare machines and systems for tomorrow's challenges by offering innovative products and services," says Dr. Stephan Niggeschmidt, Managing Director of SLS.

As part of its digitalization strategy for spare parts service, SLS developed the digital platform "ServiceNet". This gives SLS customers access to Siempelkamp Lifecycle Services, which accompany plants throughout their entire life cycle. One of these applications is the online spare parts catalogue, which allows spare parts to be quickly identified. Another will be the online availability of the entire plant documentation: 3D drawings, a plant structure tree and assembly-related parts lists provide a striking representation of spare parts. This online spare parts catalogue will also be available for existing plants.

Valuable impulses gained

SLS's conclusion: "In addition to statements on satisfaction with our service quality, the survey helped to prioritize the various objectives of modernization measures. This gives us important clues as to where we need to put our focus," explains Dr. Stephan Niggeschmidt.

The SLS team uses all statements and suggestions for improvement to further optimize its overall service. "This is where the experience gained with our Service & Logistics Center comes into play. On this basis, we ensure even better availability and faster delivery times," says Niggeschmidt.

"We would like to thank all participants for their time and the suggestions they have provided with their feedback," says the SLS team.

Composites press systems

Start of production with prime-time effect

In the late summer of 2019, three exceptional projects of the Siempelkamp Composites division reached the finishing line: Two SMC production lines at PM Composites in Togliatti/Russia, Samara region, and another system installation at a new Polish customer were put into operation successfully. All three projects illustrate the great trust placed in Siempelkamp's expertise in composites equipment worldwide.

by Carsten Daub

The two acceptance tests in Russia represent the successful implementation of one of the largest orders ever placed by a customer in the Siempelkamp composites business. PM Composites, a wholly-owned subsidiary of JSC Zavod Prodmash, ordered two complete SMC production lines, consisting of a 1,500 tons SMC press system and a 1,000 tons SMC press system including robot automation. With this order volume, the company relies on Siempelkamp's competence to open up prospects in the automotive industry for the sale of larger quantities of SMC components.

The opening ceremony organized by PM Composites on October 8th attracted big attention: Here, local and national politicians from Russia followed the invitation, and the state TV stations, including Russia 1, also paid attention by broadcasting the event. Siempelkamp made it into the prime time of Russian TV reporting! Carsten Daub represented Siempelkamp with a speech before the two press lines were formally presented to the audience. After these two successfully completed projects, a framework agreement with Siempelkamp paves the way for a long-term cooperation.

A complete system press made by Siempelkamp was also successfully accepted by a Polish customer. This project started with a public tender and convinced the customer both technically and economically. The acceptance of the main parameters took place in front of the customer; performance parameters, geometric dimensions, safety instructions led to the transfer to warranty.

The three successful acceptance tests show that Siempelkamp maintains its high standards right up to the home straight.





F.l.t.r.: Geoffrey Robson
(Siempelkamp Australia), John Borg
(Managing Director Borg Manufacturing),
Marc Müller (Siempelkamp Germany)



ContiRoll® on top in “Down under”

New MDF forming and press line for Borg

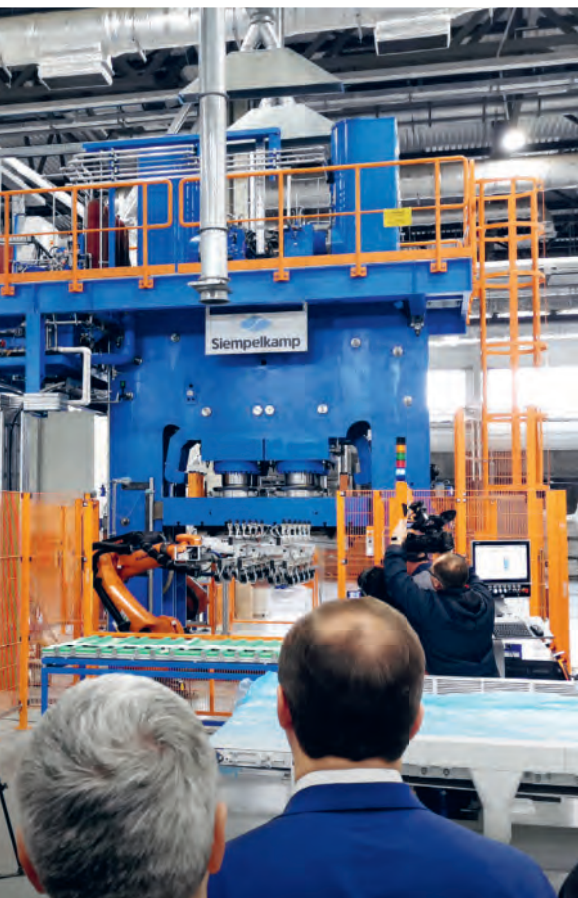
“Down under” relies on the ContiRoll®: Borg Manufacturing Pty Ltd. ordered a new MDF forming and press line for its Oberon site. The leading Australian producer of melamine-coated boards did not opt for Siempelkamp support for the first time.

by Marc Müller

Borg Manufacturing Pty Ltd. replaces an old multi-opening line with an MDF forming and press line including an in 8' × 18.8 m ContiRoll® with lightboard package. The order volume also includes a Siempelkamp Compactor, which provides effective protection for the steel belts in the press and provides plant operators with significant capacity and quality improvements, especially for the production of thin MDF boards. Also included is the connection to the existing high-bay warehouse, which retains the existing fiber preparation of the old plant.

The production spectrum will include boards in a thickness range from 1 to 25 mm. The use of the lightboard-package also enables the production of particularly lightweight fibreboards. Borg can thus rely on a diversified product range with a wide range of thicknesses and densities.

LIGNA 2019 marked an important milestone for the current order as well as for a previous one: While negotiations for the new MDF plant started at the time of the trade fair, the Siempelkamp plant for the production of particleboard ordered in 2016 was accepted by Borg in New South Wales. With Siempelkamp Pty Ltd., the Australian Siempelkamp representative office is, once again, represented directly on site to ensure smooth processes and reliable support.



Büttner dryer and
energy plant for
ENBoard Co. Ltd

Fit for the Japanese industrial standard



EnBoard-Order: The full spectrum

In addition to the overall plant design, the order volume for ENboard Co. Ltd. includes all core machines for wood processing, power generation and drying as well as classification and gluing systems. Siempelkamp also supplies the forming and press lines as well as the board handling systems. The heart of the new plant is a Generation 9 ContiRoll® press with a PMDI package (PMDI=polymer of diphenylmethane diisocyanates), Büttner's indirect drying technology and an energy plant.

The plant will mainly be operated with recycled wood and will primarily serve the local market with formaldehyde-free, heavy, particleboard.

In August 2019, ENboard Co. Ltd., a joint venture between furniture manufacturer Eidai Co., Ltd. and Japan Novopan Industrial Company Ltd., ordered a new Siempelkamp particleboard plant for the local market. The supply share of the Siempelkamp subsidiary Büttner – two indirectly heated dryers and an energy plant – is worth a closer look.

by Jörg Melin

Japan Novopan Industrial Company Ltd has been the quality leader among Japanese wood-based panel manufacturers for decades and has positioned itself on the local market. Most recently, the company entered into a joint venture with Eidai Co. Ltd. and founded the new company "ENboard". Together, the companies are regarded as market leaders in the Japanese engineered wood industry. The order for the new Siempelkamp production plant (see box) at the foot of Japan's landmark, Mount Fuji, ranges from wood preparation to finishing to the overall planning of the plant. About 10 years ago, the company bought a plant in Krefeld and is now, once again, relying on the former team, which had maintained a close relationship with its Japanese partner over the years.

Büttner's scope of supply consists of two indirectly heated rotary bundle dryers – exceptional in the wood-based panel industry, but a proven Novopan concept. As more and more Siempelkamp customers, the Japanese company ordered the proven combination "dryer plus energy plant", because Büttner's competence to supply both systems convinces the market. "The control and regulation of our systems alone is designed in such a way that all production parameters can be taken into account and varied if necessary. If, for example, the energy requirement changes, an integrated control process between the dryer

and the energy system can do the adjustment much more accurately and efficiently than if the two systems were managed separately," explains Carsten Otto, Sales Director at Büttner, the concept.

The dryers together have a throughput of 30,000 kg/h, the energy plant a firing capacity of 18.5 MW, generated from a grate burner and two dust burners. The scope of supply consists of the complete plant including radiation and convective heaters as well as evaporators and economizers.

The energy supply is ensured by a combined steam and thermal oil plant. The indirectly heated dryers are heated with steam, the ContiRoll® and the downstream process with thermal oil. Büttner's interface competence also includes the complete planning of steam and thermal oil pipelines, cyclones and combustion chamber walls.

Yes, we can JIS!

A special feature of the contract is the strict adherence to the Japanese JIS standard. Here it is not just a question of ensuring that the materials used meet the JIS standard. The design and calculation of the scope of delivery are also subject to the standard, as are the quality management and the entire logging of a project.

Already during the manufacturing process in Germany, the Büttner team ensures that the JIS standards are taken into account. This is a complex process that not every company can or is willing to perform. "The JIS standard is not necessarily stricter than comparable European standards such as DIN, but different. It goes without saying that we are prepared to accept it – and it may open the door for us for further projects in the Japanese market," says Jörg Melin, Sales Manager at Büttner.

The design work for ENboard Co. Ltd. has just been completed. At the beginning of 2020, deliveries to Japan are on the agenda – and many important milestones of a tight schedule have been reached!



The Japanese Industrial Standards (JIS) define standards for a wide range of products and technologies. They are developed by the Japanese Industrial Standards Committee (JISC), the national standards body in Japan.

Products from the area of mechanical and electrical engineering, the mining sector, automotive construction, railway or shipbuilding – but also ceramics, medical equipment or management systems are standardized according to the JIS standard.



Joint event at LIGNA 2019, f.l.t.r.: Yohei Murata (Manager of Product Design and Development Group, Japan Novopan Industrial CO., Ltd), Noriko Nishino (Novopan), Kenishi Miura (Novopan), Yuji Kitanishi (Novopan), Dr. Jochem Berns (Siempelkamp), Christoph Michel (CEO Siempelkamp), Naoki Ishii (Director Eidai Co., Ltd) Makoto Takahashi, Taku Yamamoto (President Novopan), Dr. rer. nat. h. c. Dieter Siempelkamp (Honorary Chairman of the Advisory Board of the Siempelkamp Group), Jürgen Philipps (Managing Director Siempelkamp), Yasushi Takahashi (Director, General Manager of Production, Novopan), Michael Bischof, Alexander Röwe, Marc Müller (all Siempelkamp)



ATR Industrie-Elektronik GmbH

Off into new industries with **competence** in switch cabinet construction.

Managing Director Timo Amels describes his company, ATR Industrie-Elektronik GmbH (ATR), as a “qualified manufacturing company”. This Siempelkamp subsidiary lives and breathes switchgears and supplies them worldwide – this benefits the large-scale plant as well as the pizza in the frozen foods section of the supermarket.

by Stefani Stampe



The core competence of the Siempekamp subsidiary ATR is control cabinet technology, the 'central nervous system' of each plant. This is where all information comes together and where upcoming switchgear tasks are guided, early on, in the right direction. If this does not happen, the entire technical system can come to a standstill and no longer serve its purpose in the process chain.

ATR produces switchgears up to 1,000 volts on an area of 3,200 m² at the Siempekamp headquarters in Krefeld. This makes the company one of the largest manufacturers of its kind in Germany. ATR switchgears are used in the automotive sector, in turbine and compressor technology, or make a name for themselves in cooling and air-conditioning technology. The boom sector of renewable energies as a customer also stands for ATR's entry into ever new fields of application: Here the company supplies, for example, switchgear and control systems for wind power and photovoltaic plants.

Equipping Siempekamp's large-scale plants with precisely fitting control cabinet solutions is thus one of ATR's central core competencies – the company's positioning in new business fields is another. What makes ATR so interesting as a "qualified manufacturing company"? For customers with a "smart factory" profile, in-house switch cabinet production with all accompanying processes is often unprofitable. This is where ATR provides excellent support: strongly individualized products



We implement special solutions for many areas and offer everything from a single source, from switch cabinet construction to electronic assemblies such as isolation amplifiers, PID controllers and other components to switch cabinet wiring.

Timo Amels
Managing Director
ATR Industrie-Elektronik GmbH

combined with flexible production – with this concept, ATR is positioning itself in more and more branches of industry. “We are a recognized specialist in this field. If an in-house switch cabinet production is not worthwhile for a company, we implement the quality standards of this customer exactly. Upon request, we can act as a full-service provider that accompanies customers from material procurement to the actual switchgear construction to the final switchgear inspection,” says Timo Amels.

Ability is good, certification even better

It is important for manufacturers and customers to comply with national and international standards in switch cabinet and switchgear construction. Here ATR has developed clear advantages and delivers technical solutions according to all desired and required standards, starting with the conception of control cabinets and components up to testing and final acceptance. **ATR specializes in the standards DIN, EN, ISO, NEC, UL, cUL, CSA and EAC.** “The UL and cUL systems for the North American market are certified in-house by our authorized employees,” reports Stephan Rabsch, Production Manager at ATR. UL stands for Underwriters Laboratories, founded in 1894, an independent organization that tests and certifies products for safety. ATR participates in UL's Panelshop program and is always up to date with the latest standards due to its close exchange with the organization. Advantage for the customer: Switchgear combinations that are built, tested and approved by ATR in accordance with the UL standard receive an official inspection tag (UL label), so that additional UL tests at the end customer's premises are eliminated or minimized.

Switchgears: From wooden panel installation to high-tech solution

During the first stages of switchgear development, the assembly of the components was carried out on hall walls, later on wooden panels, then on slate or marble panels to avoid the risk of fire. The panel concept made it possible to install the switchgear and measuring devices on the front, while the wiring took place on the back side.

The development in terms of automation was just as far-reaching. Control technology replaced operating personnel as early as 1950. Today, switchgears are systems with the highest degree of automation – three-digit system numbers can be controlled via a central control station; people only have to be on site for monitoring and maintenance.



ATR switch cabinet construction



With the 100% inspection, ATR also uses an early quality management instance. It deals with any conceptual errors that may occur, for example, in the design process. "Due to the realistic simulation of the drive technology in the ATR test facility, the inverter technology, for example, can be equipped directly with the order-specific drive parameter data set and then tested," says Jan Schürmanns, Project Manager Automation at Siempelkamp. The advantage is that switchgear assemblies are supplied error-free to the final customer's site for later installation.

ATR expertise – established in many branches of industry

- + Automotive industry
- + Building materials industry
- + Chemical, petrochemical and pharmaceutical industries
- + Power generation
- + Handling, packaging and transport technology
- + Wood-based panel industry
- + Steel and metallurgical sectors
- + Cooling and air-conditioning technology
- + Machine tool industry
- + Forming technology



Siempelkamp Maschinenfabrik GmbH

Central components of a multi stud tensioning machine manufactured for the first time

**An important milestone at Siempelkamp Maschinenfabrik in Krefeld:
For the first time, the team manufactured the support ring for a stud
tensioning machine from low-alloy, quenched and tempered fine-
grained structural steel. The company is thus adding a central service
to its vertical range of manufacture.**

by Ralf Meier

The multi stud tensioning machine is a product that is developed, designed, assembled and commissioned by Siempelkamp NIS Ingenieurgesellschaft mbH, based in Alzenau, according to the customer's requirements for the respective application. It is used in nuclear power plants to open and close reactor pressure vessels of different sizes and designs.

As the first project in Krefeld, Siempelkamp Maschinenfabrik was commissioned by Siempelkamp NIS with the mechanical machining of the support ring for a new nuclear power plant construction project, according to Russian design, in India. The pre-machined forged blanks were supplied from Asia. The material used – a low-alloyed, quenched and tempered fine-grained structural steel with a yield strength of approx. 900 MPa – with its high carbon content and other alloying elements such as chromium, nickel and molybdenum poses great challenges for the welding planning, qualification and execution.

Due to the enormously long material procurement time for the forged fine-grained structural steel, it was necessary to rule out manufacturing faults with the component through systematic planning and trial machining. Siempelkamp Maschinenfabrik therefore decided to use the time until the arrival of the original material for test machining and welding on test pieces of the same material. "This allowed us to test and secure the mechanical machining processes in advance – and also determine the optimum welding parameters," describes Ralf Meier, Managing Director of Siempelkamp Maschinenfabrik.

As part of a welding procedure test together with TÜV Nord and subsequent testing in a materials testing laboratory in Mülheim, the Maschinenfabrik team determined the mechanical-technological quality values of the weld metal and the heat-affected zone on the specimens. The results were compared with the standard values and confirmed the correctness of the previously planned welding processes, parameters and the entire heat management.

Multi stud tensioning machines for nuclear power plants: background

To open and close a reactor pressure vessel, the studs, which can be up to two meters long, are all hydraulically extended at the same time by almost 4 millimeters with forces of up to about 1,000 metric tons per stud and pressures of up to 2,200 bar. The multi stud tensioner elongates 52, 54, 58, or 60 reactor pressure vessel studs depending on the reactor pressure vessel type simultaneously. The specialist calls this procedure stud tensioning. The nuts, which have dimensions between M150 and M210, can thus be loosened without great effort. The studs are then unscrewed and transported separately or with the stud tensioning machine to a storage location in the reactor building. Then the vessel cover is lifted off the bottom part – the pressure vessel is open.

In the latest generation of stud tensioning machines, the simultaneous hydraulic elongation and turning of the studs are only one of many available functions. The transport of the reactor studs and cover nuts, as well as the measurement, acquisition and recording of all relevant operating conditions and parameters, are integrated into the systems. For example, during a tensioning process, the actual stud elongation is electronically recorded for all reactor studs, displayed on a screen in the control panel of the tensioning machine and stored on a PC. After the tensioning process is completed, a confirmation that the reactor vessel is properly closed can be retrieved.



Nuclear power plant Biblis

At the same time, six Siempelkamp welders successfully passed a welder examination and thus qualified for the special project.

For the project-related component, however, further preparatory measures had to be taken to ensure that the complex manufacturing process – consisting of welding, non-destructive testing, mechanical processing, complex measurements and control stops – could be carried out without problems and within the tight time schedule.

For the entire welding process, a concept for the heat management before, during and after welding was worked out together with Richter Wärmebehandlung in order to meet the technological challenges of the base material. A sophisticated heating element arrangement was developed to ensure that the heat flow over the components was as uniform as possible and that a locking mechanism was installed to minimize distortion: While all welding areas could be preheated, they could also be reached through a window in the insulation for welding.

Parallel to the welding tests and procedural tests, Manfred Biermann, Head of large-scale machining, and his team of CNC programmers, work planners, foremen and machine operators focused on the challenges of mechanical machining of the support ring.

First of all, a machining concept had to be developed including the tools and cutting materials suitable for the material. Especially for the small high-pressure channel bores, the sequence of the machining steps was simulated in several iteration steps in the 3D model on the computer.

The defined machining concept was tested for many hours on a test piece at the PAMA boring mill. After all sample machining operations had been measured and found to be in order, the team focused on the concept for clamping the support ring. The support ring with a diameter of approx. 5 m exceeded the clamping surface of the turntable at the PAMA boring mill by more than 1 m. Nevertheless, it had to be ensured that the support ring, which weighed approx. 40 metric tons, was securely and stably fixed during machining.

For this purpose, the team developed an adapter plate which was fixed to the PAMA turntable and to which the support ring was then clamped. “This was the only way to ensure that both the dimensions of the machining points with their extremely narrow tolerance zones as well as the very precise shape and position tolerances of the support ring and the surface qualities could be achieved,” recalls Manfred Biermann.



Preheating and welding of the flange connection on one half of the support ring

End of the test phase = start of the project phase: a challenge for people and machines

In June 2018, the support ring segments were delivered from Asia, measured by the quality inspectors of the machine factory and positioned and prepared for the subsequent work steps.

In the summer of 2018, welding these components, which had been preheated to over 300 °C, posed a major challenge for both man and machines. Siempelkamp Maschinenfabrik successfully accepted this challenge.

Immediately after the welding work, the components were slowly heated to the specified stress-relief annealing temperature of just under 600°. After a holding time of several hours, they were cooled down again just as slowly with an extremely low temperature gradient in order to keep the residual stresses in the components low. The employees dimensioned the holding temperature in such a way that it remained well below the tempering temperature from the

quenching and tempering process of the base material. The reason: In this way, the desired mechanical-technological properties of the component remained unaffected.

After cooling, one of two accompanying samples was worked out. In a materials testing laboratory in Mülheim, Germany, the required sample size was examined from the specimens. The values determined on the test pieces were then compared with those from the certificate of origin of the South Korean forge: Green light from the laboratory, as all values were the same!

At the same time, the in-house inspectors in Krefeld checked all welds using the non-destructive test methods MT, PT and UT (see info box). Here, too, there were no negative results, so that nothing stood in the way of the release for mechanical processing of the components.

During the mechanical processing of the support ring, regular inspection steps were carried out in order to check and confirm the planned work result again and again. >

Non-destructive testing methods: background

In non-destructive material testing, the quality of a workpiece is tested without damaging the material. The following methods are used:

- Visual inspection (VT)
- Dye penetrant testing (PT)
- Magnetic particle testing (MT)
- Ultrasonic testing (UT) and
- X-ray inspection (RT)

With these test methods, specially educated, trained and certified personnel are able to detect and classify surface defects, near-surface defects and volume defects.

In the case of surface defects, the defects appear optically through the test equipment. On the one hand by the dye penetration agent, which collects in cavities in the surface and becomes visible through the subsequently applied contrast medium. On the other hand by magnetized powder, which collects in the cavities near the surface and is made visible by a UV lamp.

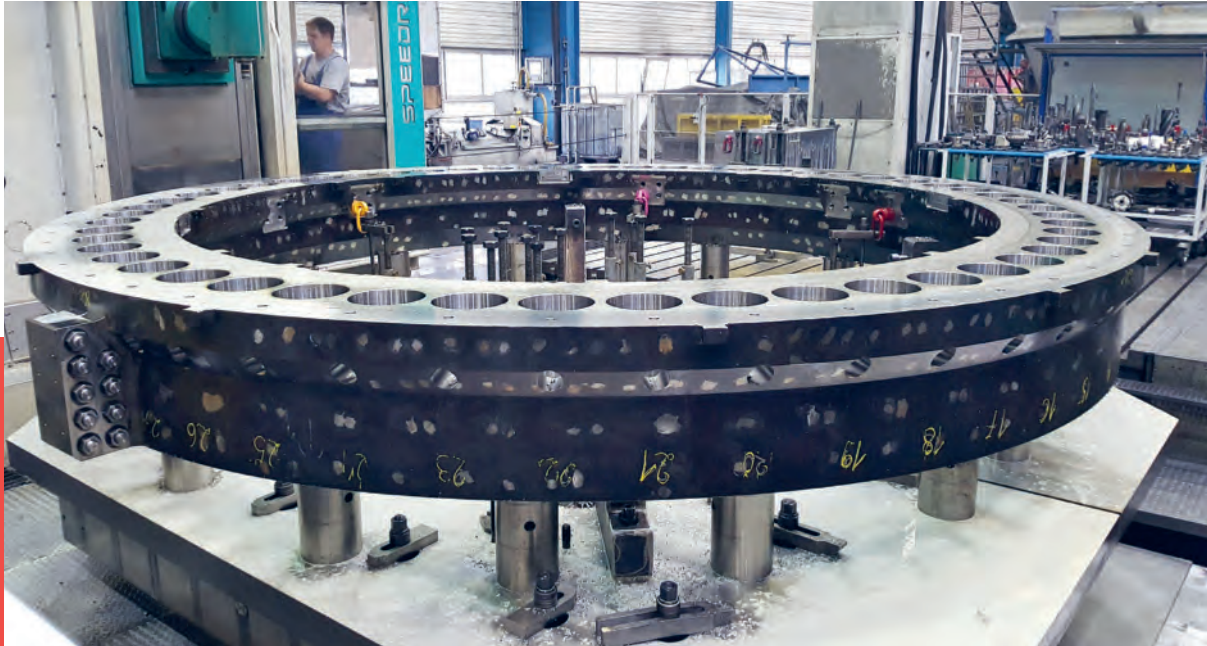
During ultrasonic testing, a volume inspection of the workpiece or a weld seam is carried out.

Errors – e.g. cracks, cavities or separation points – cause a deviating reflection behavior (echo) of the sound waves. By evaluating the transit times of the sound waves, the type and position of errors that deviate from known target values can be detected. In this way, wall thicknesses, layer thicknesses and hardness depths can also be measured.

All the material testing methods described are used daily at Siempelkamp Maschinenfabrik. "Through the systematic use of the test procedures, our highly qualified test personnel ensure that only components that meet or even exceed the high requirements of our customers leave the factory", says Ralf Meier, Managing Director of Siempelkamp Maschinenfabrik.



Ultrasonic testing of the connecting flange of a segment of the stud tensioning machine



Mechanical machining of the support ring on a CNC-controlled plate boring mill

After several hundred processing hours, the good news: There were no deviations, all dimensions and tolerances were achieved as specified by Siempelkamp NIS.

This was followed by non-destructive tests, cleaning and rinsing processes, a load test with 1.5 times the nominal load, sand blasting, an application of a special paint finish, a final pressure test of the inner duct system at approx. 2000 bar and another surface crack test. Only then were the components approved by Siempelkamp NIS for the assembly of the hydraulic clamping tools and the electrical control system.

Parallel to the support ring, the test stand for this order was manufactured in the machine factory. The test stand is used during acceptance and also later at the customer's site to check the function of the machine before each use in order to guarantee full functionality during application in the nuclear power plant.

This assembly also required many hours of oxyacetylene flame cutting, welding, testing, measuring, mechanical processing, painting and assembly until the test stand was ready for assembly and testing of the stud tensioning machine.

In October, Siempelkamp NIS started the two-month assembly of the machine. The pressure cylinders, the turning devices, the cabling and the software program were installed and the NIS assembly team carried out the troubleshooting. From mid-December 2018, the Siempelkamp NIS service team carried out the final tests with the customer at the machine factory as well as the acceptance test under the direction of NIS quality inspector Jörg Stahlschmidt.

At the beginning of 2019, the machine was dismantled into its individual main assemblies and packed. In March 2019, the machine was shipped to the nuclear power plant, where it is currently stored.

The successful completion of the first support ring for a hydraulic stud tensioning machine manufactured by Siempelkamp Maschinenfabrik led to the placement of another three projects as orders in the machine factory. "We are looking forward to expanding and deepening the experience gained in order to process the next orders even more efficiently," says Managing Director Stefan Ziemes.

After the support ring: further production elements

In the meantime, further assemblies for production at Siempelkamp Maschinenfabrik have been identified and have already been ordered by Siempelkamp NIS.

As part of the current projects for one nuclear power plant each in the USA and China, not only the support rings and the test stand are manufactured in Krefeld. The Siempelkamp Maschinenfabrik team also manufactures the working platforms, the test studs and the clamping cylinders.

In particular, the hydraulic clamping cylinders with their high quality requirements regarding the materials used, their dimensional requirements and the high hydraulic pressures of up to 2,000 bar pose a challenge both to the manufacturing and the assembly know-how of the employees and to the machinery required for this.

“We will also overcome these obstacles and thus be able to manufacture a high proportion of stud tensioning machine assemblies in our company in the future,” says Managing Director Stefan Ziemes confidently. “Made by Siempelkamp in Krefeld” is the motto of the Maschinenfabrik!



Left: Fully assembled stud tensioning machine; top right: commissioning of a stud-tensioning machine for a nuclear power plant in China; bottom right: clamping cylinder

4.0 INDUSTRY

Siempelkamp Maschinenfabrik GmbH

Digital tool management

by Manfred Biermann



New storage concept: quick overview, ergonomically favorable storage/retrieval of the often very heavy tools

Manufacturing companies are always faced with the task of increasing their productivity. The possibilities of digitizing logistical processes are trend-setting here. Siempelkamp Maschinenfabrik relies on digital tool management to make single-item and small batch production even more efficient.

Basically, all processes along the logistics chain offer the potential to be tighter, more efficient and streamlined. As an essential logistics process in the machining production environment, Siempelkamp focuses on the entire tool management process. The process comprises numerous activities: It starts with the definition of the required tools within the framework of NC program creation, is dedicated to the assembly and measurement of the tools and the subsequent provision of the tools for machining. This also includes the returning of tools that are no longer required to the tool shop after machining has been completed.

This process is highly complex, especially in individual and small batch production companies. "This becomes clear at Siempelkamp, for example, when we stock more than 3,000 different individual tool parts due to our very broad machining spectrum," explains Ralf Meier, Managing Director of Siempelkamp Maschinenfabrik. The spectrum ranges from indexable inserts and various basic holders to a wide variety of basic tool bodies. From this large number of individual parts, several thousand different complete tools can be assembled to carry out the various milling and turning operations. "In order to master this complexity and above all to reduce it, we rely on innovative data processing concepts," says Ralf Meier. This corresponds with the requirements of modern Industry 4.0 concepts. >

Industry 1.0 to 4.0: From mechanization to digitization



Industry, derived from the Latin “industria”, means as much as diligence or hustle and bustle. The scale from Industry 1.0 to 4.0 includes groundbreaking inventions: In the eighteenth century, in England, for example, the first mechanization of work processes began through the use of hydropower as propulsion energy – Industry 1.0 was born. Industry 2.0 stands for the use of electricity at the end of the 19th century. Henry Ford, who first used assembly line work in car production in 1913, played a major role in this development. Communication has also been accelerated by telephone calls and telegrams.

Industry 3.0 is the name given to the automation phase: Artificial systems took over process control and, if necessary, process control tasks; in 1947, for example, the “Automation Department” was set up in the Ford Motor Company. From the 1970s onwards, the focus was on electronics and IT – following the large calculating machines, the personal computer for office and household formed a new branch of industry. Industry 4.0, in turn, stands for modern technology and production in the context of the digital revolution – the keyword is “networking”. This is no longer just about the development of new technologies, but also about the changed world of production and work in the context of digitization and globalization.

Data processing supported value creation – the start

Manufacturing is a place of action – it involves many people, tasks, workplaces, machines. Where and in which state of operation are the tools? Those who do not create systems quickly lose the overview. In order to prevent input errors due to manual data input, Siempelkamp has for years been transferring tool correction data via data line to the control systems of NC-controlled machines after measuring the tools in the tool presetting. This essential first step towards a data processing supported value-added chain in tool management had to be expanded.

For this purpose, Maschinenfabrik has implemented a tool component management system in recent years: Based on parts list information, the complete tools for turning and milling are assembled in such a way that a “perfect match”

is created: The tool that is used in the real manufacturing world matches in every detail the tool that was previously selected in the virtual world of programming and simulation.

In addition, the tool presetting building was modernized and the storage of tools and tool components was converted from a large number of pull-out cabinets to a modern high-bay storage system. This data processing supported warehouse management increases transparency and enables faster retrieval of tools. Is a tool completely assembled in stock, can it be assembled from available individual parts or has it already been handed over to a machine for machining? Everything can be retrieved transparently. By reducing the space required in toolmaking by almost 50 %, the team also gained valuable hall space for other uses, e.g. as material provision space.

Digital machine factory: Perspectives

In a next step, a comprehensive inventory management system is currently being set up so that both the inventories in the toolmaking warehouse and the tools provided to the machines can be recorded as circulation inventories. The systematic evaluation of these inventory and movement data provides the necessary information to achieve two important goals: Reduction of tool diversity and increased availability of tools on the machines.

“In this way, the effort involved in toolmaking itself can be reduced. The costs for assembly and subsequent disassembly of tools can also be reduced if, for example, reliable information on the frequency of use of the tools is available. In the future, it will be possible to include in the decision-making process whether a tool is to be stored as a complete tool or in individual parts,” summarizes Stefan Ziemes, Managing Director of Siempelkamp Maschinenfabrik.

Digital tool management at Siempelkamp Maschinenfabrik:

- Up-to-date, efficient management of complete tools, components and accessories
- Structured, systematic storage
- High transparency of tool inventory and consumption
- Higher availability, quick processing
- Reduction of tool requirements, systems and manufacturers (thanks to higher standardization)
- Reduction of the effort required to assemble tools
- Better planning of requirements
- More efficient and error-free production process



Conversion from horizontal to vertical storage –
150 m² hall space now usable for other purposes

Continuous data processing supported process chain in tool making



1) Setup sheet – with all parts list data for the tool requirements of an NC program



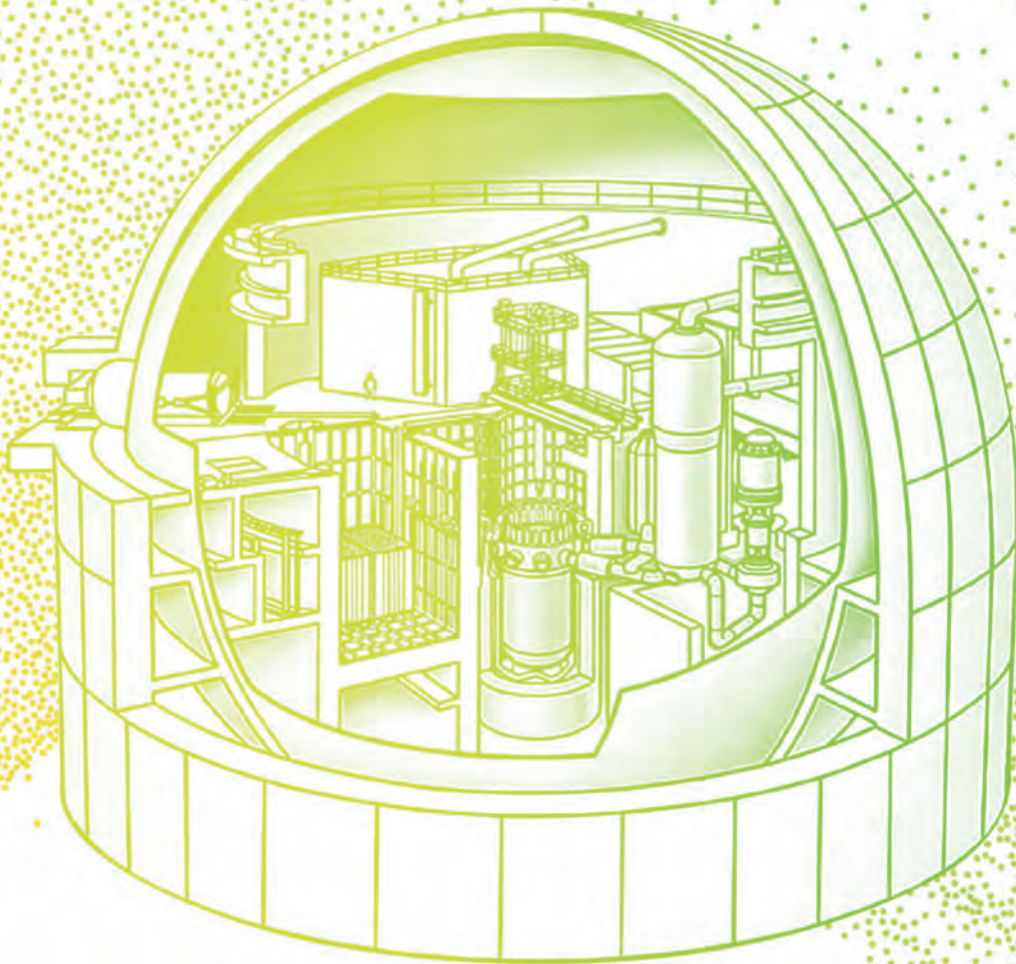
2) Tool management system – displays the tool requirements online and in comparison to the stock level



3) Stock removal picklist – is generated after the tool management system has checked which complete tools are available and which tools are to be assembled from individual parts



4) Warehouse management system/stock removal order – receives the need for tools and individual tool parts



Siempelkamp NIS Ingenieurgesellschaft mbH

3D activation calculation method for the decommissioning of nuclear power plants: “Monte-Carlo” concept for success

by Dr. Imrich Fabry

Monte Carlo is not only the scene of international glamour, but also a mathematical technique. The decommissioning projects of Siempelkamp NIS, for which an innovative calculation method is used, show how it works.

Most recently for the Mülheim-Kärlich nuclear power plant: With the successful completion of the activation calculations for this nuclear power plant, Siempelkamp NIS created the prerequisites for successful decommissioning. Mülheim-Kärlich is one of a number of nuclear facilities (pressurized water and boiling water reactors) whose activity inventory could be successfully calculated with the new 3D activation calculation method developed by Siempelkamp NIS.

The planned decommissioning of all nuclear facilities in Germany due to the energy transition and the dismantling of international nuclear power plants pose considerable technical and economic challenges for the operators. For the decommissioning of a nuclear power plant, precise knowledge of the radioactive inventory of all components resulting from decades of operation of the plant is required. On the one hand, this is required for the decommissioning license, on the other hand, it is economically impracticable to carry out sampling measurements everywhere in the plant and for each individual component. For this reason, exact calculations of the radioactive inventory of all components are indispensable with respect to a safe and economic decommissioning planning.

To achieve this, Siempelkamp NIS Ingenieurgesellschaft mbH developed an innovative new calculation method based on three-dimensional simulation software for nuclear facilities called MCNP, which was invented in Los Alamos / USA. It makes it possible to calculate the radioactive inventory of the power plant with a high level of detail. In addition to the detailed realistic modelling of the 3D geometry, this new method includes, for the first time, the entire performance history of the plants running for several decades with precisely all used fuel elements. This procedure is now implemented as standard.

The calculation method makes it possible to make predictions regarding the radioactive inventory at every point in the plant with previously unattained accuracy, even in the long-term temporal preview. This makes it possible to determine the smallest levels of activations, even those below the limit of naturally present radioactivity, for the reactor pressure vessel including all internals – this also includes the components further outside, such as the biological shield and loop lines up to the steam generators. >

Challenges in
decommissioning

Innovative
calculation method

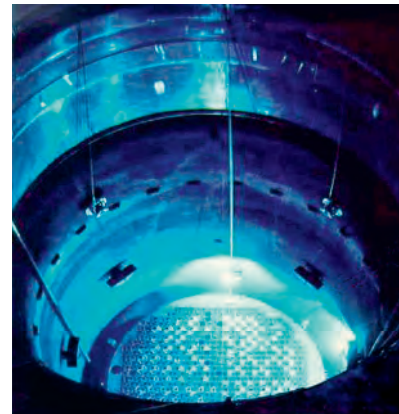
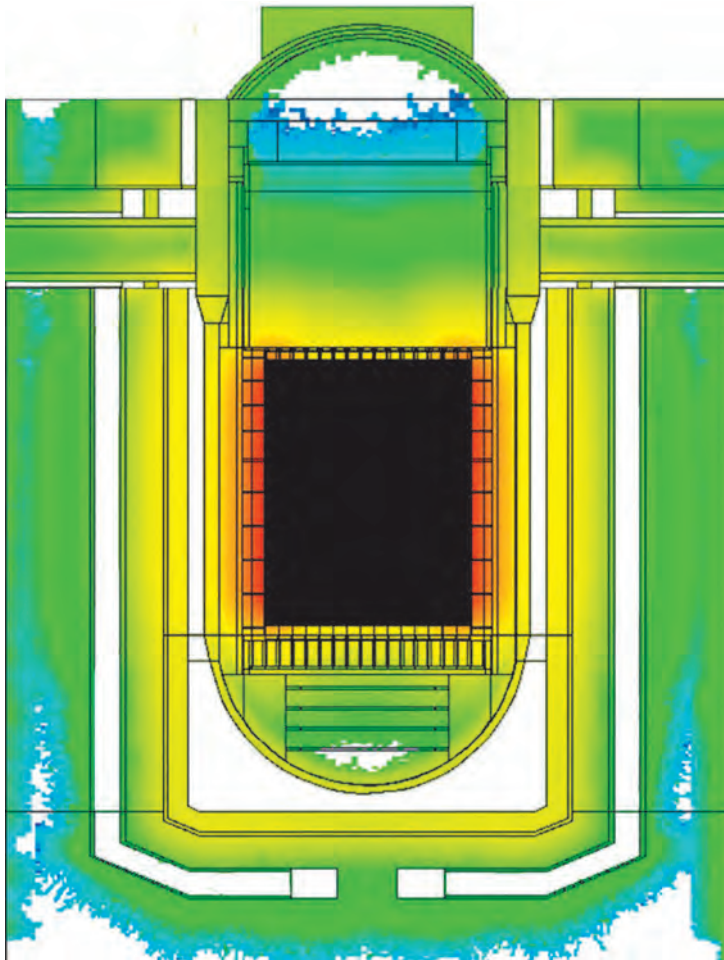
Siempelkamp NIS Ingenieurgesellschaft mbH has already successfully applied the new process on an international level for the pressurized water reactor at the Krško nuclear power plant in Slovenia and within Germany for the two reactor units of the Biblis plant (RWE Power, pressurized water reactors) and the Isar 1 nuclear power plant (PreussenElektra, boiling water reactor) – now also for the pressurized water reactor at the Mülheim-Kärlich nuclear power plant (RWE Power).

Accurate results
Low overall activity

It was found that the new 3D calculation method delivers more accurate results than the previously used 2D calculation methods: At the Mülheim-Kärlich nuclear power plant, the total activities were 4 times lower, in the case of Biblis even almost 10 times lower. “This is important because the nuclear disposal of nuclear power plants is very costly. The operation of a nuclear power plant leaves behind radioactive building structures and internals which must first be dismantled and then disposed of as radioactive hazardous waste in specially designed containers,” explains Dr. Imrich Fabry, Project Manager Activation Calculations at Siempelkamp NIS.

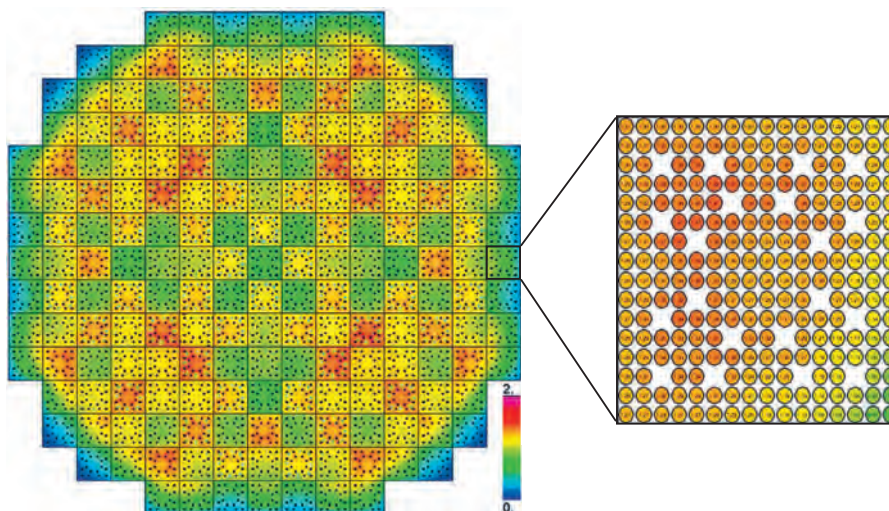
Large savings potential

Compared to previous planning calculations, considerable savings in cast iron containers can be achieved with the new 3D activation calculation method when planning the dismantling, since a much larger proportion can be classified as “medium-activated” or even as conventional waste. “Medium” or “weakly activated” waste is disposed of in considerably cheaper containers. In the case of Biblis, this corresponds to savings of around 30 million euros.



Top: Opened reactor pressure vessel with a view of the fuel elements of the reactor core, next to it the section of the 3D activation model. Section: The core is the source of the neutrons that leave the reactor core during reactor operation and activate parts of the reactor building.

Left: Neutron intensity distribution at the vertical section of the 3D activation model of the NPP Biblis, reactor unit B: The reactor core (black) is enclosed by the reactor pressure vessel. Stronger activation (red) prevails near the core. The activity decreases from green to blue. Areas of the bottom of the reactor pit and the area in the reactor pressure vessel below the reactor head have no reactor neutrons (white). Parts of these components can be disposed of cost-effectively as conventional waste because they have not been activated.



Typical power distribution in a running nuclear power plant: Representation of a reactor core with its 193 fuel elements. Red areas generate more heat and more neutrons than the blue areas. The section shows a single fuel element.

The Siempelkamp NIS 3D activation calculation method – innovation thanks to the Monte Carlo Method

Siempelkamp NIS has developed its own new 3D activation calculation method based on the Monte Carlo method (see info box). The method performs computer calculations of the transport of nuclear radiation (here neutrons), which is generated during the operation of the nuclear facility, through complex building structures in three-dimensional geometry. Thus it is possible to exactly simulate the sometimes very long path of a single neutron through all complex building structures and different materials on its way – exactly as it actually occurs in nature.

As a result it is possible to make every location in the model of the reactor accessible and to illuminate complex structures in high resolution – e.g., reactor pressure vessels, core internals or structures located further out such as the biological shield or reactor coolant pipes. In particular, neutron scattering – also known as neutron streaming effect – can be made visible in remote areas. This 3D computational model is the prerequisite for an “activity atlas”, which represents a kind of relief map of the entire reactor.

Activity atlas

New is the combination of a high-resolution, complex 3D reactor model with the simultaneous consideration of the operating history of the plant. In the case of Biblis, this was 39 years since commissioning. With the successful connection of the operating side with the dismantling side in the activation calculation, Siempelkamp NIS broke new ground. “Only this combination makes it possible to calculate the activity inventory of a plant with unprecedented accuracy. For this to work, the Monte Carlo program had to be modified and the calculation code partially reprogrammed,” describes Dr. Fabry.

A reactor unit is covered in such a calculation model with approx. 100,000 “detector cells” each. The neutron flux emerging from the reactor core is simulated during the operating years and the number of neutrons arriving in these detector cells is registered over time. This information is used to calculate the activity in each detector cell. The model of such a reactor to be calculated will be developed in close cooperation with the dismantling experts at Siempelkamp NIS. The experience gained in previous decommissioning projects will be incorporated into the modelling phase of the 3D activation calculation procedure. In the case of the reactor pressure vessel, the grid arrangement of the detector cells is harmonized with the dismantling and packaging strategy. As a result, the number of containers required is optimized.

Experience leads to optimization

Finally, the results of the activation calculations are stored electronically in an “activity database”. In this way, the activity values can be determined for any location and time in the reactor. >

What can “Monte-Carlo” offer?

Monte Carlo simulations are used when analytical formulas fail to evaluate natural processes or when their solution is too complex. Difficult questions in physics, in the world of finance and much more can be answered with Monte Carlo methods and are therefore used in these areas.

The method originates from stochastics, a branch of mathematics, and was developed by the physicists J.v. Neumann, Metropolis and Ulam as part of the Manhattan Project (Los Alamos, USA). It is based on the very frequent realization of random experiments. With the help of the probability theory, problems are solved numerically, relying on the law of large numbers: If a random experiment is carried out repeatedly under the same conditions, the relative frequency

increasingly approaches the probability of the random experiment. The random experiments (in the case of activation calculations, a large number of neutrons simulated along their entire path) are performed by generating computer-generated random numbers.

When computers did not yet exist, sequences of random numbers from the Monte Carlo casino were used – hence the name of the method. If such a Monte Carlo program as MCNP used by NIS is also combined with the physical data of the scientific research of the last 80 years, this method is superior to all others in accuracy. The data are provided by international organizations such as the Nuclear Energy Agency (NEA) within the OECD and the International Atomic Energy Agency (IAEA).

Intelligent calculation methods and parallel processing save time

The Monte Carlo calculation method is so accurate because the entire transport of a single neutron with all its complex physical reactions is always simulated throughout the entire plant. However, this has its price: only if a large enough number of such neutrons are started is the calculation result accurate enough at the desired location. It is a stochastic method that combines elements of statistics with probability theory.

Advanced process

Since the objective is to calculate the radioactivity in the entire plant, the computing effort of such a Monte Carlo calculation is immense. For one reactor unit a single standard desktop PC would have to calculate for about two years to accomplish this task. The computing time can only be reduced to a few weeks thanks to intelligent calculation methods (variance reduction). With these highly developed methods, the trick is to transport neutrons preferably to locations in the reactor building that are rarely illuminated under normal circumstances. This does not change the result of the calculations. Parallel processing, i.e. the distribution of the calculations over several computer cores, helps to support this.

In this way, it is possible to obtain results that cannot be achieved with conventional calculation methods; for example, the (radio)activity originating from the reactor core is attenuated by as many as 15 orders of magnitude to the outer end of the bioshield. This means that practically no measurable radiation is emitted from the biological shield (for comparison: 15 orders of magnitude correspond to the ratio between the diameter of a hair and the diameter of the sun). On the other hand, the calculations also show that the reactor vessel head and the reactor coolant lines are activated from the outside by neutron streaming.

These results make it possible to identify “hotspots” (areas of particularly high radioactivity) that dismantling personnel can avoid. Therefore, the dose uptake for the personnel involved in the dismantling can be minimized and the amount of waste for the final disposal can be precisely determined. This enables plant operators to plan their costs with a high degree of certainty. The newly developed process thus offers an effective tool for the safe and economic planning of the dismantling with great savings potential for the operators.

Minimize dose uptake

The validation of the newly developed calculation method – i.e. the test of the validity of the calculation results – was carried out at Biblis A in 2017 using local dose measurements. The results showed there was an excellent match between calculation and measurement.

The experience gained from previous projects can even be used for new construction projects of nuclear power plants: The high-resolution calculations make it possible to see which remote areas in the reactor building are activated by neutron bombardment. Thus, recommendations can be given for better shielding or alternative building materials which are only activated to a small extent by neutron bombardment. As early as 2018, Siempelkamp NIS could use the experience gained from the activation calculations in a first project for the planning of the new construction of the PALLAS reactor (Netherlands), which is to produce important isotopes for medicine in the future. This was presented by the NIS team in March at KONTEC 2019, the International Symposium on the Conditioning of Radioactive Operational and Decommissioning Waste. Siempelkamp NIS is well positioned with its 3D activation calculation method to support German and international operators of nuclear power plants in cost-efficient decommissioning and even new construction planning.

Monte-Carlo method
for new construction projects



Siempelkamp NIS at the KONTEC 2019 in Dresden:
“From beginning to dismantling”



Meeting of the “Women in Nuclear” at the stand of Siempelkamp NIS, KONTEC 2019

bulletin sweepstake

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Publisher

G. Siempelkamp GmbH & Co. KG
Marketing/Communication Department
Siempelkampstr. 75
47803 Krefeld (Germany)

Executive Editor

(Officer responsible for compliance
with German press law)
Carola Lenkewitz

Text

Dr. Silke Hahn

Design and Layout

Sebastian Paetau – Grafik & Konzept

Printing

Druckerei Ley + Wiegandt GmbH + Co KG

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and English. Reprints, in whole or in part and
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