



# Siempelkamp

Issue 02 | 2014

**Dr.-Ing. Hans W. Fechner:** "With intelligence and innovative strength becoming an internationally operating technology group" **Six times 'First Board' in Russia/Belarus:** A summary **Energy conversion with Siempelkamp cast components:** A perfect fit, not series production! **Siempelkamp decontamination facility for Krümmel NPP:** Safe, solid, reliable during the phase-out

# bulletin

The Siempelkamp Magazine

PEOPLE | MARKETS | MACHINES



- 04 Ralf Griesche  
"With intelligence and innovative strength becoming an internationally operating technology group"  
Dr.-Ing. Hans W. Fechner
- 12 René von Dombrowski  
The virtual development of plants sets new performance standards  
Set up for success right from the start
- 16 Ulrich Bens  
Most flexible surface lamination of all times with the KT 700 short-cycle press  
KT 700 for Egger St. Johann, Austria
- 22 Helmut Rieck  
A perfect fit, not series production!  
Energy conversion with Siempelkamp cast components
- 28 Antonius Lanfermann  
Stud tensioning machines, fast antelopes and revisions – and a solid cooperation  
30 years of activity at Koeberg NPP
- 34 Hans-Joachim Galinski  
A summary  
Six times 'First Board' in Russia/Belarus
- 42 Liliane Walzel and Konrad Strein  
Safe, solid, reliable during the phase-out  
Siempelkamp decontamination facility for Krümmel NPP
- 48 Ronald Hammerbeck  
15,000 t on their way to Longkou, China  
Transport of Nanshan presses
- 54 Thomas Pieper  
Innovative handling technology for a new tandem press line  
Strothmann products for the automobile industry
- 58 Dr. Stephan Niggeschmidt  
Siempelkamp service joins forces  
Siempelkamp Logistics & Service GmbH
- 64 Ute de Vries  
Siempelkamp Krantechnik gets high-tech rail vehicles moving  
From the coast to the Rhine
- 70 Andreas Freis  
Siempelkamp – Hot platen manufacturer since 1883  
Production competence: Machine Factory
- 74 Emilien Collard  
Lord of the rings  
Successful startup of a closed-die forging press at JSC Metallurgical Plant Electrostal
- 80 Peter Petrasch  
From cost calculation to holistic controlling  
Project analysis for the dismantling of nuclear plants
- 86 Andreas Klug  
Capacity increase with a Büttner energy plant  
Camsan Poyraz

## Imprint

Publisher G. Siempelkamp GmbH & Co. KG, Marketing/Communication Department, Siempelkampstr. 75, 47803 Krefeld (Germany)  
Executive Editor (Officer responsible for compliance with German press law) Ralf Griesche Text Dr. Silke Hahn, Inga Bambitsch and Matthias Johannes Bauer  
Typesetting and Layout vE&K Werbeagentur GmbH & Co. KG Printing Griebisch & Rochol Druck GmbH & Co. KG

This publication is published in German and English. Reprints, in whole or in part and including illustrations, require the Publisher's permission, which in most cases is gladly given. Visit Siempelkamp on the Internet: [www.siempelkamp.com](http://www.siempelkamp.com)



Dr.-Ing. Hans W. Fechner  
Chairman of the Executive Board  
G. Siempelkamp GmbH & Co. KG

## Dear Readers:

We are all finishing off 2014 in a time where the global economy is in a tense situation. Each of us is faced with the challenges to keep our companies on a successful course and to lead our employees into a sound future.

Thanks to the good positioning of our companies in diverse markets, the Siempelkamp Group has secured a safe cushion for 2015. As a highly specialized technology-driven niche provider, we have achieved a leading position in our market segments and gained your trust. The ten orders for wood-based material production plants received by September 2014 alone are a pleasing result and demonstrate that our customers continue to believe that we are the right partner.

We were able to significantly strengthen the core of our business with our product developments in recent years and future-oriented investment decisions. With an extended and strong Siempelkamp management we will try to provide this strategy with even more fine-tuning and energy from this point forward.

The extended management represents all relevant task areas of the machine and plant engineering business unit. We are increasingly concentrating on expanding the synergies between our three business units including the machine and plant engineering, the casting technology and the nuclear technology business units. In this way we make our technical excellence, closed service chain and economic efficiency available for our customers.

Read our Bulletin and find out which projects in 2014 have determined your and our agendas and how we will increase our efforts to keep pace with time and concentrate on our markets. We hope and wish that 2015 will be a good and successful year for you!

With best regards from Krefeld

A handwritten signature in blue ink, appearing to read 'H. Fechner'. The signature is fluid and cursive, written in a professional style.

Dr.-Ing. Hans W. Fechner

Dr.-Ing. Hans W. Fechner:

“With intelligence and innovative strength becoming an internationally operating technology group”



Dr.-Ing. Hans W. Fechner

**What and who will influence the Siempelkamp Group in the future? We talked to Dr.-Ing. Hans W. Fechner, spokesman of the management of G. Siempelkamp GmbH, the lead company of the machine and plant engineering, casting technology, and nuclear technology business units.**

By Ralf Griesche

**Bulletin:** Dr. Fechner, as the Chairman of the Executive Board of Siempelkamp Holding you focus on the strategic orientation of the Siempelkamp Group. Where do you see your fundamental task when it comes to positioning Siempelkamp successfully in the future?

**Dr.-Ing. Hans W. Fechner:** As in previous years, my main task is to advance the growth of the Siempelkamp Group. Today, Siempelkamp is a highly specialized, technology-oriented niche provider which has achieved a leading position in all its markets. With our product developments in recent years and future-oriented investment decisions we were able to significantly strengthen the core of our business and have become more international. The dominant company of the Siempelkamp Group, led by the Holding company G. Siempelkamp GmbH & Co. KG, is Siempelkamp Maschinen- und Anlagenbau GmbH (SICO) with a consolidated

turnover of approx. €10 million, 1,970 employees, and a current order backlog of €700 million. Sico generates 70% of the Group's total revenues. Of that number 70% is generated by the wood-based materials sector. Siempelkamp Maschinen- und Anlagenbau GmbH is the parent company of all 28 companies of the machine and plant engineering business unit and has an equity capital of approx. €80 million. With its subsidiaries Siempelkamp Maschinenfabrik (machine factory), Siempelkamp (Wuxi) Machinery Manufacturing Co., Ltd., Siempelkamp CZ s.r.o. Blatnice and CMC S.r.l. Colzate, Siempelkamp Maschinen- und Anlagenbau GmbH has an excellently developed worldwide production network. The planning and engineering company Sicoplan N.v. in Belgium, Siempelkamp Handling Systems Bohemia, Siempelkamp India and Siempelkamp Singapore represent our internationally networked engineering competence for our complete product range. 10 worldwide operating service companies, above all SLS GmbH in Bad Kreuznach, are essential service providers for our customers.

All in all, we have achieved much in recent years and we are drawing closer to the perfect completion of our tasks and objectives which we have set for this decade: We are on our way to becoming an internationally-operating technology group. At this point, I would like to explicitly point out the outstanding achievements of our foundry and nuclear technology business units.

Our foundry has the unique technological knowledge for the production of large castings made of nodular graphite cast iron and our nuclear technology business unit is one of the only companies in the world capable of dismantling reactor pressure vessels of old nuclear power plants with the highest safety and quality standards. This also clearly reflects our technological competence.

We will continue down this road according to our motto: „Innovation is our tradition“ and from an organizational standpoint we will focus on expanding the international character of our Group.

**Bulletin: What does internationalization mean for Siempelkamp?**

**Dr.-Ing. Hans W. Fechner:** We are a company with a long tradition and a high share in exports. Our customers are located worldwide. We have to comply with the needs of our customers and have to understand their market requirements. Our competitive edge is based on the technological superiority of our products which we want to and have to sell at a reasonable price. Advanced technology also requires significant efforts in the area of research and development. At our headquarters in Krefeld we operate a technical center which is second to none. Here, highly professional staff concentrates especially on technology for the





production of wood-based materials. Our technologists working in the area of material development at the Foundry also set standards concerning goal-oriented product innovations, for example, regarding the material development for components used in the generation of wind energy. The Siempelkamp subsidiary Sicoplan in Belgium sets standards worldwide in the field of general engineering of entire plants for the production of wood-based materials including OSB, particleboard and MDF. Here, we have highly motivated staff working for us at a high technical level which is, at the same time, able to assist our customers in different languages. Let's not forget our Czech engineering office SHB which plays an essential part in providing design services for our solutions in machine design. For our startup personnel it is increasingly becoming a matter of course to work together with the employees from our offices in India and Singapore during the startup phase of our complex plants. Our production facilities in China, Rumania, the Czech Republic and Northern Italy have become essential parts when it comes to

the manufacture of our machines and plants. And let me get to the heart of the issue: Due to the excellent order situation, we have a very good capacity utilization at all locations until the end of 2015.

Especially the engineering services carried out at these international locations of the Siempelkamp Group are increasingly gaining importance. In a few years it will be a matter of course that top engineering services will not only be provided by our employees in Krefeld but also by our employees in India and China. Internationalization furthermore means to be locally present for our customers and in their markets.

**Bulletin: Which role will product innovations play here?**

**Dr.-Ing. Hans W. Fechner:** I believe we also have accomplished excellent achievements in this area in recent years. Let's remember the large success of our Ecoresinator which features low

investment costs and tremendous resin savings. This system has literally been developed according to the plug and play functionality and has been sold 21 times to date. Let's also think about the success story of our Generation 8 ContiRoll® press. This type press has been sold 18 times since LIGNA 2013. It is characterized by perfect pressure distribution and offers customers great flexibility. It represents the best „racehorse“ in our „stable“ with different ContiRoll® models. Let's also not forget the leading role we have meanwhile adopted in the field of large closed-die forging presses for the aircraft industry. We recently sold another 12,500 t closed-die forging press to a Chinese customer. By the way, this example also demonstrates the close cooperation with our foundry. The remarkable thing is that we completely manufacture these machines in Krefeld and afterwards ship them to China. This represents a unique argument for the competence at our Krefeld location.

Let's take, for example, the buzzword „Industry 4.0“. For many years Siempelkamp has assumed a pioneering role in this area even before the buzzword was created. Our process control system Prod-IQ®, which is in reality an artificial intelligence system, has convinced many customers and we are continuously developing this system. The future belongs to complete plants whose individual parts constantly communicate with one another and are capable of informing the operator in due time of their maintenance and optimization needs, both in ecological and economical respect. Let's also think about our new developments in the area of highly precise presses for composite technology. The precision of these machines is now similar to that of machine tools. I believe that an active culture of innovations penetrates our company on many levels.

**Bulletin:** For that the company needs excellently trained employees.

**Dr.-Ing. Hans W. Fechner:** Exactly. Therefore, the objective of our personnel development is to support the different skills and talents of our employees and seek the right mixture when hiring new personnel. Next to our close relationship with the Hochschule Niederrhein (University of Applied Sciences) which offers cooperative engineering training programs, we increasingly rely on young engineers which have successfully completed a Bachelor's or Master's degree program. In this respect our cooperation with RWTH Aachen (a research university of technology) plays an important role. We not only have a demand for the classical disciplines such as general mechanical engineering but we need engineers from almost all technical fields. We need professionals from areas ranging from material science, to systems technology, to automation technology. We also like to provide opportunities to

foreign job applicants, for example, from Eastern Europe or India. According to the findings of Mr. Gaus, intelligence is distributed evenly throughout the world.

From a personnel development point of view, our company is fit for the future. This not only applies to our engineering and technical positions but also to the right placement of top management positions. This includes the fact that the generational change in the management of the machine and plant engineering business unit was implemented in due time with managers that possess entrepreneurial talent. This change took place in keeping with our company's tradition as a family business.

**Bulletin:** Where will we see you in the near future?

**Dr.-Ing. Hans W. Fechner:** You will see me increasingly more often at our customers' locations and in the frontline of our company's technology development.



“Give me five”:

# Siempelkamp's new team of managing directors

The top management of Siempelkamp Maschinen- und Anlagenbau GmbH was restructured in 2014: The number of managing directors was increased from two to five – an indicator for bundling essential competences within the management level. In an interview with Bulletin Stefan Wissing, spokesman of the management of Siempelkamp Maschinen- und Anlagenbau GmbH, explains the backgrounds, reasons and strategies.



Dipl.-Kfm. Stefan Wissing

**Bulletin:** The Siempelkamp management was systematically expanded. What was the main driver?

**Stefan Wissing:** Siempelkamp Maschinen- und Anlagenbau GmbH has developed into a leading company of a subgroup within our Group of companies. We have successfully established ourselves as a machine and plant engineering company with a total of eleven subsidiaries responsible for development, sales and production worldwide. The tasks of our management have become more complex because the management of our sub-

siidiaries has to be anchored in the core of our company.

We have strengthened individual areas of responsibility by putting one management director each in charge of our core competence areas including sales, technology, research and development. In other words, all important Siempelkamp areas are presented within the management.

**Bulletin:** What will change now that the new team of managing directors is in place?

**Stefan Wissing:** The number of managing directors was expanded from two to five, the group making strategic decisions and solving challenges has become larger. We believe that ideas have to be developed together within the group because the best ideas are the result of teamwork.

**Bulletin:** This takes time...

**Stefan Wissing:** That is correct but it is worth it for us. Coordination in a larger team takes more time; however, the commitment to work together promotes creativity, discourse and finally the results. Thinking along with others has priority over quick decision-making. At the same

time, thinking in a team requires discipline because as individual managing directors we are used to only giving concrete instructions to our corresponding area of responsibility.

**Bulletin:** Your area of responsibility has been and remains service. Service has been a prominently represented topic within the management – which strategy do you follow?

**Stefan Wissing:** A clear one. It is our objective to strengthen Siempelkamp service in all areas including the wood-based material industry as well as the areas of metal forming, rubber and short-cycle presses. We have to focus even stronger on the question: What do our customers need during the entire life-span of their equipment? In this area, we want to provide plant operators with first-class support.

**Bulletin:** Which services has Siempelkamp available for plant operators?

**Stefan Wissing:** Our support is quick, especially concerning the supply of spare parts where our delivery time is hard to beat. The reason our response times are so fast is that we have quadrupled our





Jürgen Philipps, Dr. Joachim Martin, Heinz Classen, Samiron Mondal, Stefan Wissing (left to right)

inventory in the last few years. This strengthens our reputation in the market and has tremendously increased customer requests.

Due to our service subsidiaries represented worldwide, we are close to the plants of our customers everywhere. Our technicians are excellently trained; we constantly develop new and customized upgrade concepts. In short: We always have a good solution available when it comes to bringing a 20-year old plant up-to-date. This claim is also firmly anchored with our customers. In the market, we enjoy the reputation of being a supplier with state-of-the-art technology and powerful innovations. We represent the largest installed base, stand for top quality, high reliability and timeliness.

**Bulletin:** What will you do to maintain this standard on such a high level?

**Stefan Wissing:** We will, for example, further expand our service subsidiary Siempelkamp Logistics & Service GmbH in Bad Kreuznach and strengthen it with specific personnel initiatives. This team works according to a self-developed checklist of targeted measures of which the sustainable implementation ensures

clear reporting. Our objective: to make Siempelkamp the international standard for services for all relevant industries products in technical terms and competitive prices.

**Bulletin:** Keyword "price" – how can the price remain attractive with such high requirements for quality?

**Stefan Wissing:** We provide direct service without using negotiators. Furthermore, due to our large purchasing volume we can provide good pricing for spare parts. But let's not talk about the price alone. The technical progress invested in Siempelkamp products is a huge advantage for plant operators. And should problems arise, we are there to solve them. We know the equipment our customers are using and have the comprehensive insight of the intended use for each equipment component.

**Bulletin:** Let's take a look at the bigger picture. Which strategies do you pursue beyond expanding and improving service?

**Stefan Wissing:** Our commitment in the area of metal forming is and remains on

the growth path. We have achieved an excellent reputation with our large forging presses. The first ring-rolling mill for Electrostal, which we designed and built in 2013, passed its testing at first try during the startup at the factory. Our prototypes work right away at first use!

Our vertical range of manufacture is also an advantage in the market. Our customers appreciate that we can provide the same expertise in all areas including mechanics, hydraulics and electrics. Last but not least, we remain committed to research and development. This dedication last bore fruits in the area of composite presses. As we can see, it remains exciting and our team of five will have plenty to do...

**Bulletin:** Thank you very much for this interview – as well as continued success and energy for your work!

“To see the big picture”:

# Four managing directors in an interview

In an interview with Bulletin the four remaining managing directors around Stefan Wissing describe their areas of responsibility, challenges and synergy effects.

**Bulletin:** Mr. Classen and Mr. Philipps, together you are now responsible for the wood sector, strongest area of the machine and plant engineering business unit in both turnover and earnings. What will you focus on in the future?

**Heinz Classen:** As one of the managers of this business unit I oversee strategic and technical operations. Against the background of my expertise in the market and my technical degree, I see myself as an initiator and source of ideas when it comes to product improvements or new products.

It is my task to recognize market trends and to turn these into successful products. A successful example is our resin blending system for MDF – the Ecoresinator. I have also played a leading role in the expansion of our product range all the way to becoming a complete provider of wood-based material production plants at CMC Texpan and Büttner.

**Jürgen Philipps:** As a businessman with many years of experience in plant engineering, my area of responsibility as

one of the managing directors is the worldwide sale of our products. My work begins with the active marketing of our products at trade fairs around the world and continues with visiting customers at their locations where we try to sell our technically leading products, draw up contracts, discuss financing options and finally, conclude contracts.

Of course, all of this happens in close coordination with the customer. After all, Siempelkamp’s wood-based material production plants are tailor-made, each one is unique. My objective, one that requires the utmost skill, is to gain a satisfied customer and, at the same time, achieve a sufficient margin.

**Bulletin:** Mr. Martin, you continue to implement our motto “Innovation is our tradition”. To be in charge of technology seems to be a huge area of responsibility...

**Dr.-Ing. Joachim Martin:** Apart from my responsibility for design and development for all product areas of the machine and

plant engineering business unit, I am also the managing director of our machine production factory in Krefeld.

This complex area of responsibility provides the opportunity to generate new processes and to streamline old ones. Especially the smooth interaction between sales, project planning, design, production and installation is essential for manufacturing our products.

**Bulletin:** How will you work together with the sales team in the future?

**Dr.-Ing. Joachim Martin:** What I am interested in is to intensify communication between sales and design departments. It should be the responsibility of the sales personnel to carry the issues that most concern our customers to the design department. The production and installation of our plants at the construction site are also part of this interdependent system requiring a large need for coordination and control. It is our task to review the existing structures and processes and revise them, if necessary. The objective is



Dipl.-Ing. Heinz Classen



Dipl.-Betriebswirt Jürgen Philipps



Dr.-Ing. Joachim Martin

to always provide the customer with an optimal product.

**Bulletin:** Mr. Mondal, you are the managing director for the areas of metal forming and composites. Which measures will you take to make these product areas even more successful in the future?

**Samiron Mondal:** The metal forming business was integrated into Siempelkamp's machine and plant engineering business unit eight years ago. This move has ensured us with higher resource flexibility.

My goal is to further strengthen two areas: This includes, on the one hand, the area of project planning which responds quickly and efficiently to customer requests. On the other hand, the area of design where specially trained core teams are in charge of the mechanical, hydraulic and electrical design.

**Bulletin:** The area of composites is a field in which Siempelkamp established itself three years ago...

**Samiron Mondal:** Yes, since our trials in the 1970s we have significantly upgraded our technology from a technical as well as sales-oriented point of view. We have, for example, invested in research and development and market analyses in order to understand the different processes.

This new field is backed up by the comprehensive knowledge of the press manufacturer Siempelkamp. The results are plants which are competitive from startup; this is backed by our sales successes. Since our composite presses are relatively small models with a press capacity ranging from 500 to 3,000 t, it is our task to combine the advantages of the special purpose machine builder with the efficiency of a standardized press while keeping costs low.

**Bulletin (to all):** There are many challenges in every single area! Where do you see synergy effects for the future and customer advantages resulting from such?

**Heinz Classen:** Together we support our customers from the product development, to sales, to project management all the way to the acceptance of the plant. This can take two years but has the advantage for the customers that the contact partners stay the same from beginning to end and that those contacts can take controlling actions if necessary. Apart from our technology leadership, we also achieved quality leadership. We do not want to be in a price competition with Chinese providers. Siempelkamp guarantees technically matured products based on superior technology.

**Jürgen Philipps:** Siempelkamp's business areas are now staffed in a targeted way with managing directors. Service is becoming increasingly more important. I see large synergy effects in a close relationship between service and new plant business. New products are developed with key customers; for service, modifications, and upgrades to existing plants we provide premium support. We want our customers to make good money with our plants!

**Dr.-Ing. Joachim Martin:** "To see the big picture" could be the guiding principle for my department. A prominent area of responsibility, next to the before-mentioned ones, is the standardization of our machines and plants. For a machine builder, building primarily tailor-made machines, this is a key issue for the future. I am thinking of a modular design principle from which parts can be taken as needed against the background of customer-specific requirements. The customer benefit: We strengthen our competitiveness as well as shorten our delivery times and provide steadily improving technology which will keep our customers competitive.

**Samiron Mondal:** I really support this point. A standardized foundation for machine development combined with the interpretation of customer requests and their integration as well as an optimal cost-benefit ratio – with our management structure we are getting even closer to this combination.

Furthermore, our new management make-up ensures that we can penetrate the technical requests of our customers even deeper. Our thinking process starts with the end product, we control the manufacturing process and derive from it the development of the machine.

I see synergy potentials by further optimizing internal processes which will result in a speedier and more efficient handling of projects. And let's not lose sight of the plant operator's benefit: to provide technically highly demanding and precise plants to the customer.



Dipl.-Kfm. Samiron Mondal

R. von Dombrowski, simulation engineer and G. Endberg, department head hydraulic design, during virtual system development



Set up for success right from the start:

# The virtual development of plants sets new performance standards

**Performance, reliability, precision, high energy efficiency: When ordering a plant, customers place high demands on the overall concept. Having to integrate different subsystems including mechanics, fluid technology or automation technology, the framework becomes increasingly more complex. Based on Aristotle's statement 'Well begun is half done', Siempelkamp sets the course for success at the early development stages – thanks to virtual plant development!**

By René von Dombrowski

During all plant development processes the involved engineers have to handle large amounts of information and ensure the complex design of the complete system. No basic condition, no consequential effect can be ignored: "Considering all dynamic effects, each individual system has to be designed to an optimum. The interactions between the subsystems also have to be precisely coordinated so that the plant operator can exhaust the full

performance capacity and receives an optimally designed solution," says Gregor Endberg, department head hydraulic design at Siempelkamp.

For the most part, these specific and high demands cannot be met with commercially available programs for standard plants – especially not when time and costs take their toll. That is why

Siempelkamp pursues new paths in design and uses the most modern methods in virtual plant development. The concept: System simulation programs link the individual technical fields and departments already in the early stages of development and thus, set the course for the project's success!

## Multi-disciplinary system simulation programs in a performance check:

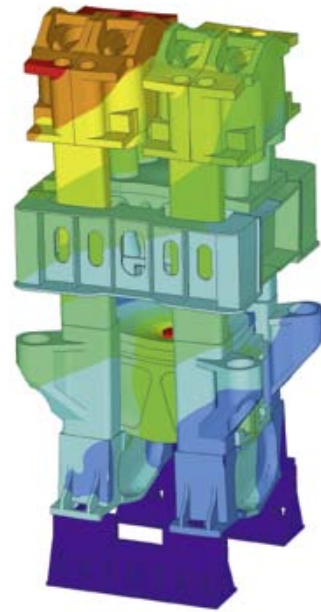
### "Yes, we can!"

- Virtual analysis of all systemic connections of the system
- Testing of innovative plant concepts by the simulation
- Optimizing component dimensions
- Determination of pipeline geometries
- Simulation of the interaction with handling systems (e.g., manipulators, robots, feeders)
- High degree of reality by comparing simulation results from the development phase with measuring data from real operation
- Integration of FEM programs and control software as well as hardware
- Customized programming of visualizations at the operator's terminal
- Digital factory design

**The concept:** By using one-dimensional, multi-disciplinary system simulation programs, Siempelkamp builds virtual system models of the complete plant during the early design stages. They already take all technical subsystems into account and allow an in-depth analysis of the systemic interdependencies with a high level of reality. The advantage: This not only allows to optimize component dimensions and determines pipeline geometries (see box) but also analyzes and tests innovative plant concepts as a whole.

For the customer this pays off as soon as the plant is running – an example: "With the help of virtual testing, we were able to lower the installed load, which a customer of a composite press had projected, by 30%. In this case, the virtual system allowed the designing and implementing of multi-level pressure storage systems. Furthermore, we developed an innovative charge management system within the simulation," reports René von Dombrowski, simulation engineer at Siempelkamp.

FEM model of a closed-die forging press



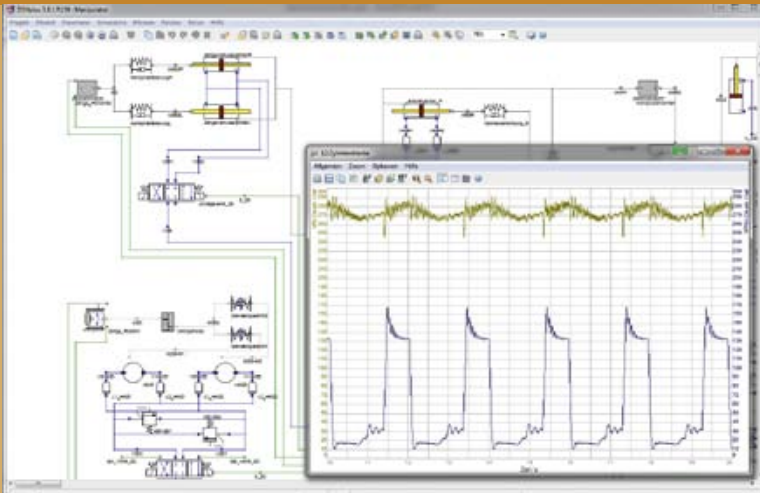
### On target in every way: overall system design

Not only the plant alone but also the interactions with handling systems, such as manipulators, robots or feeders are simulated in advance in order to ensure the required cycle times and to coordinate the driving cycles.

In order to display system models with such high level of detail, it is important to constantly compare simulation results from the development phase with measuring data under life operation conditions. Only in this way can the model-building process be permanently expanded by relevant effects and continuously improved. Siempelkamp rigorously puts this concept into action. The result are reliable plant models and realistic simulation results.

Another feature: Within the scope of the overall system design, the connection to FEM (Finite Element Method) programs offers additional detailing and takes system elasticities as well as realistic mass and inertial effects within the simulation into account. Next to using FEM calculations in the overall system design, they can also be used as a standard tool for the design process at component level in order to design stress and distortion resistant mechanical components. Tailor-made to meet customer demands, the mechanical properties of the plant can be specifically determined.

The FEM programs help to optimize the components on a mechanical level in regards to mass distribution, rigidity, and life-span. For the optimal fluid-technical design of the components, CFD program (Computational Fluid Dynamics) are used. "They allow the exact calculation of fluid flows taking into account wall



Complete system simulation of an open-die forging press during ring forging

friction and temperature fluctuations. Thus, even tank component parts or pulsation dampers can be flow-optimized in order to reduce pressure losses and consequently energy losses or to use, in a targeted manner, damping systems for the reduction of pressure pulsations," says Bernd Plate, team leader metal forming at Siempelkamp.

#### Development of innovative control concepts without taking risks

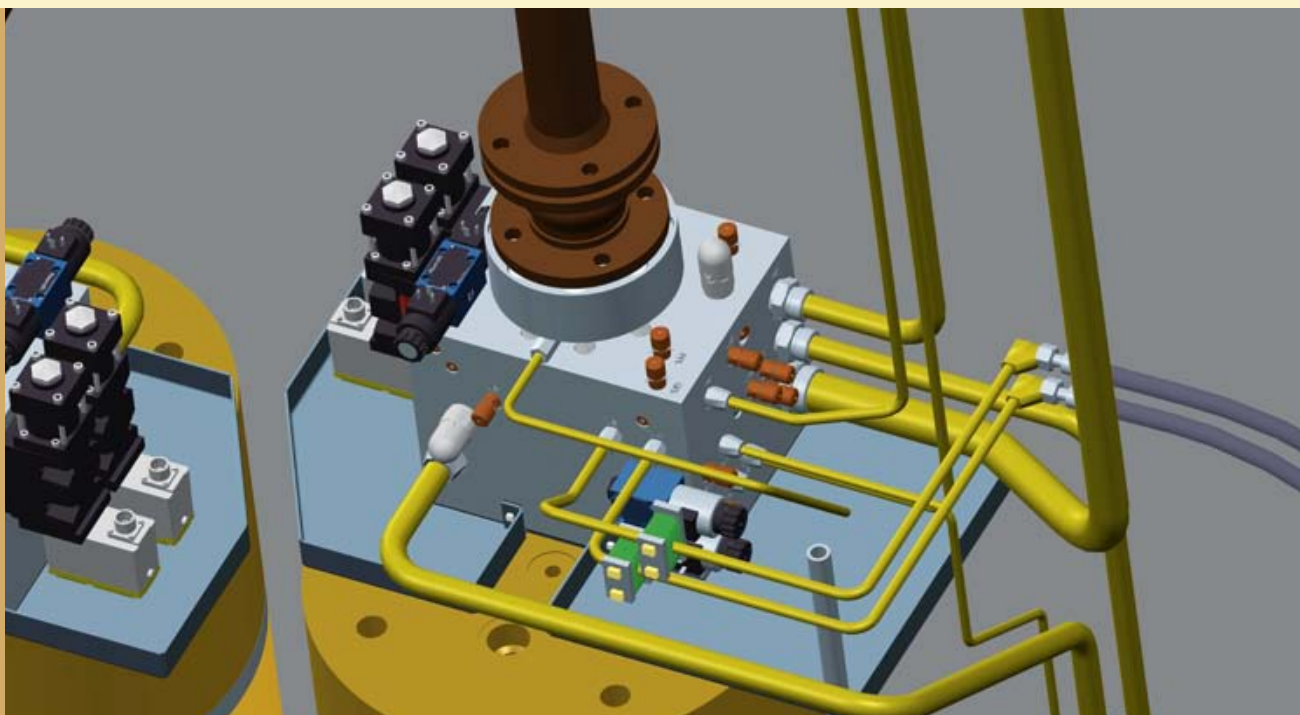
The most technically developed system is irrelevant if the automation technology slows down the concept and is not able to optimally and efficiently control the available performance

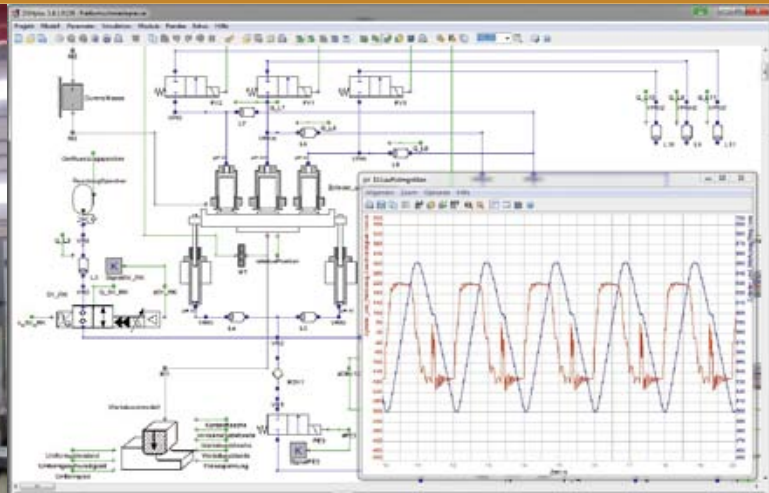
capacities. That is why the plant intelligence is developed and tested at an early stage of development by linking the control program and the virtual plant model.

Through the feedback from the virtual model, control strategies, but also the actual control hardware, can be tested way before the actual plant is built. This, in turn, results in the development of innovative control algorithms and control concepts which are optimally adjusted to the system.

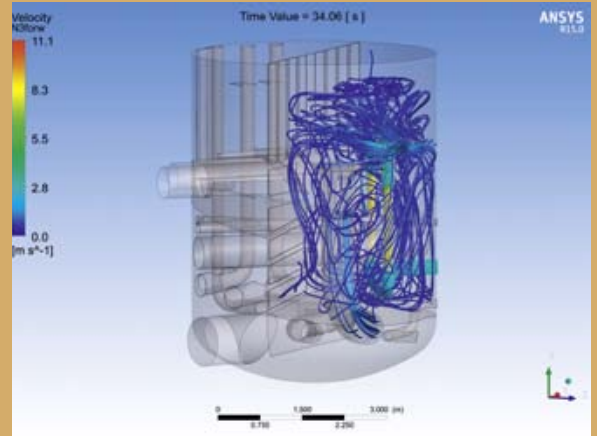
The advantages of this interconnection are obvious: The real plant only allows the implementation of very conservative control algorithms, otherwise the plant may be damaged. With the help

Virtual design of the control block of a SMC press

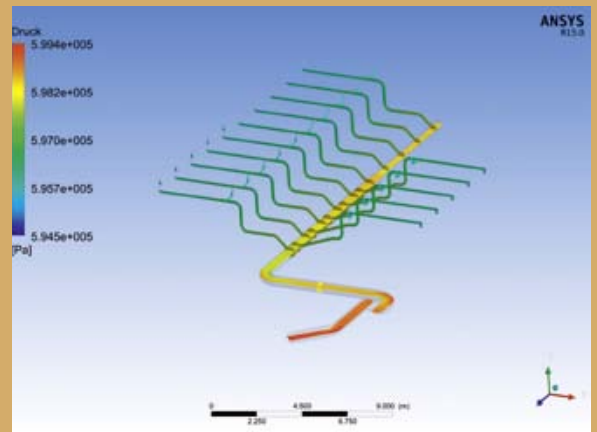




Optimizing the flow control inside a low pressure tank



Simulation aiming at reducing the pressure losses in pipeline systems



of the virtual plant model, innovative control strategies can be developed and optimized without risk. “The option to develop the control program to a high level of completion and test the program in advance at Siempelkamp is another advantage for our customers. This results in short startup times and ensures that customers can quickly start the production process!”

**Focused on the plant operator, custom-made visualizations**

The interface to the later plant operator also plays an important role in the overall concept: With the help of modern software tools the visualizations are programmed at the operator’s terminal according to customer specifications – ranging from the simple user-friendly entry mask for pass plans or production recipes all the way to the expert level with access to all system state variables. Siempelkamp also implements visualizations of hydraulic plans with current valve positions or feedback from analogue or digital input and output modules.

Last but not least, Siempelkamp also pays close attention to the demands on the ease of installation and the accessibility for maintenance purposes. With the help of CAD tools, clear plant concepts with short assembly routes and optimum accessibility for the maintenance personnel are developed. Thanks to digital factory design the plant integrates seamlessly into the customer’s location and production planning. Thus, production processes are economically optimized, capacities effectively used and set-up as well as throughput times tremendously reduced.

The advantages of this virtual development chain for the customer are versatile: The increasing standardization of plants oftentimes requires compromises on the market. Simulation tools and technical departments that are perfectly coordinated with one

another contribute significantly in optimally addressing the individual needs of the customer.

The huge efforts in the early development stages pay off: An optimal plant concept featuring high precision and performance capacity and, at the same time, optimal energy efficiency are the result of the virtual development methods. A 500 MN open-die forging press with control deviations below 5% and high precision presses with an implemented accuracy of 0.01 mm, which to date was only possible in machine tool building, are only two examples. And all that with short installation and startup times for the plants and production machines which are optimally integrated into the customer’s production processes!

KT 700 for Egger St. Johann, Austria:  
Most flexible surface lamination of all  
times with the KT 700 short-cycle press



KT 700 loading side



At Egger’s headquarters in St. Johann a new Siempelkamp short-cycle press line including paper lay-up system, loading system, press, and order sorting system has begun operation. The highlight of the 15 million Euros project is Siempelkamp’s KT 700 short-cycle press equipped with 40 cylinders for precise pressure distribution and high pressing force. This new state-of-the-art concept opens up the most flexible surface lamination currently possible for the customer.

By Ulrich Bens

In February 2013 Siempelkamp’s long-term customer Egger ordered the new short-cycle press line made by Siempelkamp for the surface lamination of particleboard, MDF and HDF. At the parent plant in Tyrol, the worldwide acting family company has expanded its production with a state-of-the-art short-cycle press line. Egger already operates the KT 700 at its French Rambervillers location – the best reference for the new order.

**Transformation genius regarding production and organization**

Apart from the KT 700 the customer ordered two lay-up stations, the press loading and unloading units, star coolers and the stacking line. Egger uses the complete concept to manufacture proven and innovative products efficiently and with high quality.

**Egger St. Johann, Austria + Siempelkamp: stations of a partnership**

- 1961:** Company founder Fritz Egger established his first particleboard plant in St. Johann, Tyrol. Next to unfinished and decorative particleboard, today the roughly 900 employees produce countertops, light-weight panels and prefabricated furniture elements.
- 1988:** The first Siempelkamp ContiRoll® line for Egger; in the same year delivery of two short-cycle presses
- 1992:** Extension of a Siempelkamp ContiRoll® to 33 m
- 2006:** Startup of a Siempelkamp line for the manufacture of lightweight frameless panels (honeycomb-core panels)
- 2008:** Egger begins the generation of district heat for the market town of St. Johann via biomass combustion with an energy plant by the Siempelkamp subsidiary Büttner.
- 2013:** Order for the latest member of the Egger machinery: a state-of-the-art short-cycle press by Siempelkamp – the KT 700!
- 2014:** Startup of the new KT 700 in St. Johann



Synchronized pore structure

**Egger’s financial year 2013/14 in numbers**

**7.5 million**

m<sup>3</sup> of produced unfinished boards (particleboard, MDF, OSB)

**7,215**

total number of employees

**207 million**

Euros investments made

**2.22 billion**

Euros in sales

## Press control



The plant is regarded as revolutionary in two ways: Not only can the press line manufacture different products and product variations; the plant is also extremely flexible regarding the surface finishing and can manufacture sophisticated special products. Standard lamination or embossed-in-register process, one or two sided, is possible.

“The new short-cycle press complements our three existing lines here in St. Johann with completely new technical possibilities. We can achieve deep three-dimensional surface structures such as synchronized pore structures with the embossed-in-register process. We are also able to manufacture different products with matching decors and textures which are interesting to more than just architects,” explains Matthias Danzl, plant manager sales at Egger.

## Siempelkamp for Egger St. Johann: brief report of a plant

1.

### Intermediate storage

For unfinished boards and decorative papers



Particleboard infeed

2.

### Lay-up stations

Installation of four magazines in each lay-up station +++ downstream intermediate storage for quick pallet changes +++ device for double-sided registered embossing process with camera systems helping to monitor the exact alignment of the decorative papers before the charge is pressed together inside the press and embossed with the help of textured caul plates +++ Advantage: the decorative papers (for wood) seize on the natural grain of the wood and gives it a natural appearance



Paper lay-up (bottom)



Raw-board placement

### Flexibility from the start

The flexibility starts with the lay-up stations. Decorative paper pallets are automatically transported from Siempelkamp's intermediate storage to the two lay-up stations in front of the press. While at one station the current production is still running, the next order is prepared at the other station. This saves time! The decorative paper can be changed without any downtime for the press. This ensures an extremely efficient and flexible production.

The press is based on the innovative KT 700 concept and promises plant operators maximum performance with premium pressure distribution as well as short pressureless exposure times.

As a specialist for presses, Siempelkamp provides the suitable press concepts for quick, precise and economical laminating of wood-based boards. During the short-cycle process, decorative papers impregnated with melamine or urea resins are pressed onto a board inside the hot press. With the increased pressure of up to 700 N/cm<sup>2</sup>, the KT 700 press opens up prospects for manufacturing high-quality and innovative new products in the area of lamination. Utilizing this press, there are hardly any limits to the creativity of the products featuring new dramatic surface structures. Deep dramatic 3-D embossing and special colorings for sophisticated living environments and so much more can be achieved with the KT 700!

The special characteristics of the KT 700 are its multi-piston design and the new cylinder design. The removal of the cylinders for servicing was simplified. The hydraulic tank which was formerly installed in the center has been replaced with two left and right mounted hydraulic tanks in the KT 700. The innovative mounting of the upper hot platen results in precise parallelism of both hot platens. With the flexible board width adjustment, the customer has control over six press systems which can be adjusted independently from one another.

The largely automated press plate changing process transports the press plates quickly from the storage shelf to the press.

3.

### Press loading

Special hydraulically-operated clamping device for the loading of the press



Paper lay-up (top)

4.

### KT 700 press

Multi-cylinder press: 40 cylinders (instead of the usual 12 to 14) for excellent pressure distribution  
+++ 180 pressings/h +++ pressureless exposure time: 0.8 seconds!



Press charging station



Press outfeed

## “Impressive special effects with the KT 700”: Interview with Egger’s managing director Albert Berktoled

Which goals does Egger have with the new short-cycle press at its headquarters in St. Johann? In an interview with Bulletin Albert Berktoled, director for technology and production at Egger Austria, explains what makes the KT 700 so valuable for the company’s market. The secret: This press deserves an Oscar for special effects!

**Bulletin:** Mr. Berktoled, after Ramber-villers, a second KT 700 has started operation in St. Johann for the Egger Group. What was the decisive factor to buy this system for a second time?

**Albert Berktoled:** Our KT 700 in France has been operating for two years now and has achieved great results. It provides the most state-of-the-art technology for applying modern decorative papers to wood-based panels. The double-sided registered embossing process\* and the

production of high-quality products with synchronous pore structures\*\* are benchmarks for us. In the area of wood grain decors and with this technology, products can be achieved which only specialists can distinguish from real wood.

**Bulletin:** How do you achieve this “deceptively-genuine” effect?

**Albert Berktoled:** Due to the accuracy of fit of the decor paper and the textured caul plate (the press plate), deep em-

bossings which are exceptionally authentic in their appearance are possible. With the use of the double-sided registered embossing process this effect can be achieved on both sides. Consider a knothole that has to be replicated as close to reality as possible. With KT 700 technology that is no problem. The knothole can be reproduced equivalent to the original in appearance on the front and back side of the board. We are proud of our new double-sided synchronized pore structures featured by the brand name “Feelwood”.

### 5.

#### Sorting and stacking of boards

High flexibility possible for stacking of several board stacks or customer orders



Cutting to size of finished boards



Lifting/turning device



Final inspection



Finished board stacking



## Albert Berktold: short profile

- 1982:** started working for Egger in St. Johann
- 1995:** switched to Egger's German location in Bevern, Lower Saxony
- 1998:** returned to St. Johann, at the same time worked for Egger Wismar in Germany
- 2001:** plant management in St. Johann
- since 2002:** director for technology and production in Austria

This represents a previously unattainable perfection in the interplay of decor paper and surface.

**Bulletin:** For which "special effects" is the KT 700 predestined?

**Albert Berktold:** The KT 700 is designed for the finishing of wood-based materials. Individually designed furniture boards, special decors, and deep structures can be achieved without difficulty. The KT 700 at this location is primarily used for special applications. Our commodity goods are manufactured on the other presses at this location. Because of its flexibility the KT 700 is so valuable to us: – it allows the manufacture of products which generate added value for us and our customers.

**Bulletin:** Are decor products a strong selling point?

**Albert Berktold:** The Egger promise "Creating more from wood" implies that we consider our role as that of an innovation driver. The furniture industry is aware of this and therefore cooperates with us when it comes to new developments. Our strong position in the market is utilized by architects, processors and furniture manufacturers to provide their customers with top products. The endless possibilities for matching decors and textures on various backing materials are a strong argument for these Egger partners and customers.

\* **Embossed-In-Register** = embossed patterns, reliefs. The double-sided embossed-in-register process can replicate wooden or stone reliefs with a genuine natural appearance.

\*\* **Synchronized pore structures**

= the result of the embossed-in-register process. Natural wood appearance. Branches and large-flowered decors with three-dimensional look and feel as well as decors with natural-looking pores in brown and grey or vintage surfaces are possible.

**Bulletin:** Last but not least, your attention is also focused on other investments at the St. Johann location...

**Albert Berktold:** We permanently strive to be state-of-the-art concerning our equipment and products. Group-wide we invested a total 207 million Euros during the financial year 2013/14. 143 million of it regarded investments in growth. A large part of this sum went to a new administrative building and a new high-rack storage system for our unfinished boards at our St. Johann location. This storage

opens up the room for 35,000 m<sup>3</sup> of products or 3,040 storage spaces. Order sorting is fully automated and reduces forklift operation to a minimum. This high-rack storage system allows us to absorb fluctuations in demand and to manage them.

**Bulletin:** Thank you for this interview and continued success for your future!



Side view



Fettling work: a housing for an underwater turbine

## Energy conversion with Siempelkamp cast components:

# A perfect fit, not series production!

What started 45 years ago with the production of compressor housings from gray cast iron has developed into a special range of products and services at Siempelkamp Giesserei GmbH: turbines and compressors with cast iron components made by Siempelkamp are a familiar brand in the energy industry, thanks to large casting competence, super-high precision and specialization. A new feature, however, is that for the first time the foundry is now supplying a product mix covering the entire spectrum of required components.

By Helmut Rieck

Siempelkamp housings for large continuous-flow machines are currently in great demand. Even after the rapid development of the energy transition, it can be seen that fossil fuel-fired power plants will retain their central significance for global energy supplies. Industrial turbines are required here for steam and gas power plants, as well as for combined cycle power plants.

Large-scale compressors for manufacturing synthetic fuels are playing an ever greater role in the energy industry. In rapidly growing national economies with rising energy requirements, the focus is on gaining independence from oil imports, e.g. with the aid of air separation and coal liquefaction. In Chinese "coal-to-liquid" (CTL) plants, synthetic fuels and other hydrocarbons are created from the extensive coal deposits present in many regions.

The Siempelkamp Giesserei has also consistently accompanied the development of the largest steam turbines. Housing sets have been built with upper and lower sections weighing an enormous 120,000 kg per housing; those dimensions were



The gigantic housing section of a steam turbine made from nodular cast iron, 55 t, goes on a journey, carefully packaged...



... and loaded onto a truck

achieved over five years ago in Krefeld, Germany, and have yet to be beaten.

Modern combined cycle power plants likewise require relatively large components for gas turbines. For around a year now, the foundry has been supplying this rapidly developing market with new components, which are currently assuming starting positions for series production. As a result of the design, the maximum unit weight is 25,000 kg.

In the field of large-scale compressors for synthetic fuel extraction, a new demand arose two years ago for correspondingly large-scale systems. The foundry was able to meet this demand, manufacturing and delivering four housing sets (upper and lower sections), each weighing 70,000 kg.

"Follow-up orders are in sight, and we are already working on plans to significantly exceed the current maximum weights for steam turbines, just in case demand



A steam turbine housing section, approx. 55 t, at the preliminary ultrasound test

becomes acute," says Helmut Rieck, looking to the future. He is the one responsible at Siempelkamp Giesserei for component sales.

Whether for electricity generation, locomotive manufacturing, shipbuilding, or aerospace, all the developments of industrialization went along with clever designs for steam or gas turbines (see box). Since the 1970s, Siempelkamp has been manufacturing large-scale components for the applications of today, and its ability to combine king-size casting capabilities with super-high precision has earned it pole position in the market.

## Gas and steam turbines: Premieres

- 1791: First patent registration for a gas turbine
- 1883: Gustav de Laval invents the impulse steam turbine
- 1884: Patent for the steam turbine of British inventor Charles Parsons. Parsons' turbine was more complex in design than that of Laval, but achieved better efficiency, and was more easily adapted to increasing steam pressure and output. It was used for electricity generation and in marine drive systems.
- 1911: The first turbine with a noteworthy degree of efficiency is built
- 1938: First stationary gas turbine
- 1939: The first jet aircraft takes to the air
- 2011: Irsching 4 combined cycle power plant: coupling of gas and steam turbines with an efficiency of 60.75%



The very first models were the compressor housings for gas and steam turbines in gray cast iron, which Siempelkamp always supplied as individual components. Today, large-scale components for steam turbines occupy an important position in the portfolio of the foundry.

#### Steam turbine components: high-performance and solid

Modern steam turbines deliver an output of up to 1,600 MW, dividing the steam flow between separate subsidiary turbines that share a single shaft. The blade lengths in the low-pressure sections of such machines exceed 2,000 mm, and during operation the blade tips can reach speeds of up to 500 meters per second. This is one and a half times the speed of sound!

In order to cope with these high internal pressures, the steam turbines require solid housing sections. As the expert, this is where the Siempelkamp Giesserei comes

into play. "We have recently realized housing set weights of 120 metric tons, and thus support our customers with components that are ideally suited to their requirements for solidity," explains Helmut Rieck.

A magic word among the requirements is "efficiency": particularly in steam and gas turbine power plants with outputs of over 100 Megawatts, the operators aim to achieve efficiency levels of over 60%. The higher this level, the lower the energy consumption and environmental pollution.

The design of the inner and outer housings of the turbines makes a decisive contribution to optimizing the efficiency. This is where Siempelkamp's competence in designing super-heavy and large-scale cast components in nodular cast iron pays off. This is how the foundry has positioned itself at the front of the market. "Compared to welded designs, nodular cast iron is characterized by improved damping and

exceptional mechanical properties during continuous operation. Nodular cast iron castings also display superior damping properties when compared to cast steel," says Helmut Rieck.

#### Compressor components: heavy-weights for pressure generation

Compressor components for centrifugal and screw compressors are also manufactured by Siempelkamp Giesserei. These are among the largest cast components, which can weigh from 10,000 to 25,000 kg.

These components are required e.g. for axial compressors, continuous-flow machines in which the air flows in an axial direction, through an alternating series of rotating and stationary blades. The air is first accelerated and then compressed. The blade channels form diffuser-like extended channels. Here the kinetic energy generated by the rotational motion of the



air is decelerated and converted into pressure energy.

These axial compressors are continuously increasing in size for use in coal liquefaction. Systems with a throughput of 1.4 million cubic meters of air per hour have been built. Siempelkamp is keeping up with this development process. "In 2013 alone, we were able to fulfill the requirements of our customers by manufacturing four housing sets with a total weight of 70,000 kg each. Further increases in performance are planned," says Helmut Rieck.

#### Gas turbine components: high performance, lower weight

Siempelkamp is also staying on the ball when it comes to components for gas turbines. These turbines demand high machine performance, low weight and dimensions, and quick-starting capabilities. It is not least for these reasons that they are used in modern combined cycle power plants.

Owing to the steadily increasing power plant sizes, corresponding stationary gas turbines have been developed. Siempelkamp has been active in this market for the last year with components of up to 25,000 kg. It is not currently anticipated that there will be demand for yet larger components in the near future. The most powerful stationary machine currently delivers an output of 375 MW.

#### Three product facets – three examples of Siempelkamp commitment to continuous-flow machines

Whether for gas and steam turbines or for compressors, when it comes to the requirements for and sustainability of its products, over the years the Siempelkamp Giesserei has remained up-to-date at all times. The company has also kept in step with the



A spiral housing, 25 t, during fettling

changing focus of demand resulting from the special market situation.

"In the 1980s the gas turbines were on top, and in the 1990s it was the steam turbines. From 2007 to 2010, under conditions of booming demand, we series-manufactured large steam turbine housings for the first time," describes

Helmut Rieck. This demand has eased off substantially. In 2014, inquiries received by Siempelkamp have predominantly been for individual job manufacturing of compressor housings and compressor spirals, and for series manufacturing of components for screw compressors. Individual manufacturing jobs for steam turbines and series manufacturing for large-scale



Cast components for continuous-flow machines today make up an important percentage of the Siempelkamp Giesserei portfolio

compressors are also taking on an important role among the incoming orders for the first half of the year.

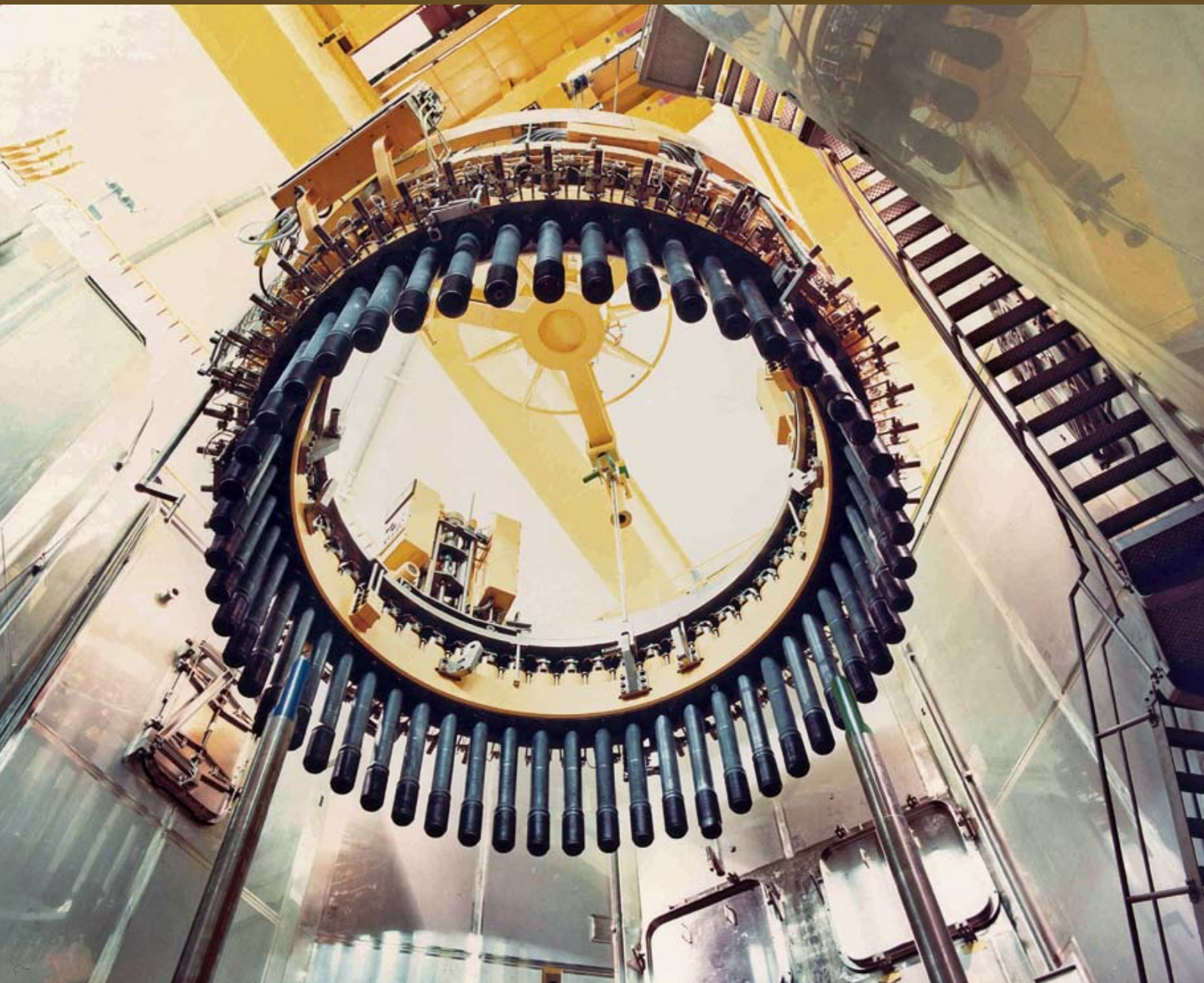
With all this changing demand, to this day there has always been one constant: the good reputation of the Siempelkamp Giesserei and its team when it comes to serving the complex requirement

spectrum of the market, e.g. high precision and tolerance requirements, in some cases with extreme surface requirements. The work of the molders, fettlers and inspection personnel is also subject to strict quality criteria.

In general, demand is tending to move towards individual job manufacturing,

while series production requirements are concentrated on centrifugal and screw compressors. "High requirements, less series production," will be the motto with which Siempelkamp positions itself in this special market in future.

30 years of activity at Koeberg NPP:  
Stud tensioning machines, fast  
antelopes and revisions – and a  
solid cooperation



The multi-stud tensioning machine descends

**What began in 1981 with the delivery of a stud tensioning machine still exists today as a productive cooperation project between two partners, between Koeberg and Krefeld/Lünen. For over 30 years, the specialists from Siempelkamp Tensioning Systems GmbH (STS) have been supporting the operators of Koeberg NPP in South Africa. A true success story!**

By Antonius Lanfermann

Zebras, antelopes and gazelles on the ground, access after registration by bicycle or on foot: this is how the Koeberg nuclear power plant in South Africa looks, parts of which like its surroundings are listed as a nature reserve. An unusual setting for the only NPP in South Africa, which is operated by the South African electricity supplier Eskom. For almost 30 years, this plant has been worked on by specialists from STS and its predecessor companies.

#### **Koeberg: an established energy alternative to coal**

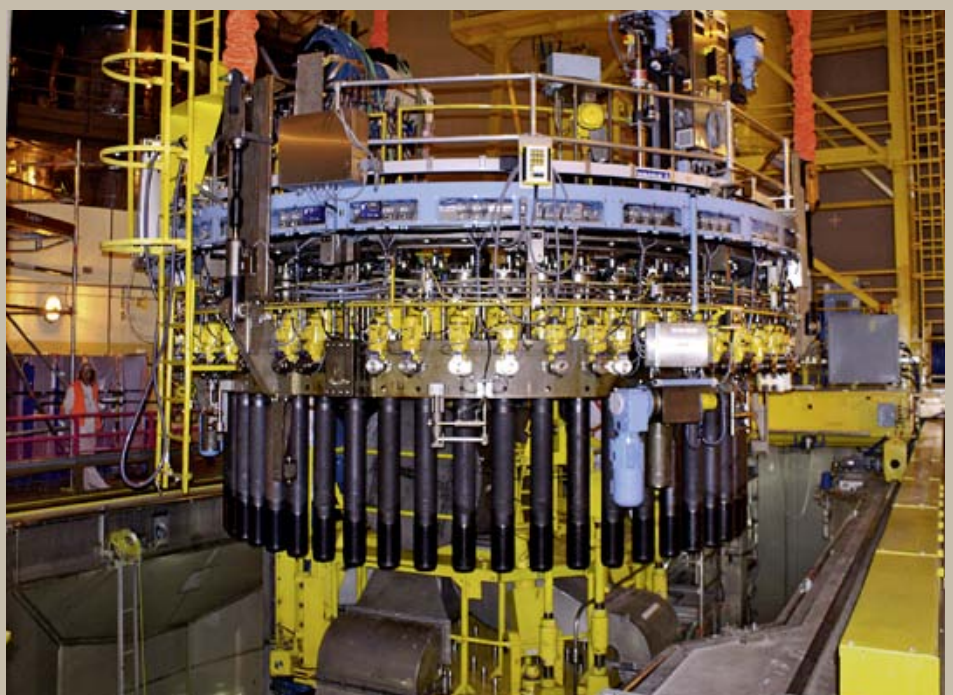
The Koeberg NPP consists of two pressurized water reactors, built on the basis of blueprints from the French company Framatome (now Areva). South Africa initiated the plant in the 1970s, in order to avoid losing sight of the connection to modern electricity supply technology. Electricity generation was secondary in those days, however, as nuclear power represented only an insignificant proportion of overall electricity production in South Africa. Even today it is still only 7%. Priority was given to the coal-fired power plants in Transvaal, and hence to the native coal, which ensured the power supply of the country. After a construction time of almost eight years, Block 1 was opened in July 1984 for commercial operation, and Block 2 followed in November 1985.

## Koeberg NPP/South Africa: Data, facts & figures

Owner/operator:	Eskom (founded in 1923 as Electricity Supply Commission in South Africa)
Location:	30 km north of Cape Town on the west coast of South Africa
Construction start:	1976
Commercial operation:	since July 1984
Active reactors:	2 pressurized water reactors 1,880 MW total gross output Reactor 1: Commissioned in 1984, decommissioning planned for 2024 Reactor 2: Commissioned in 1985, decommissioning planned for 2025
Power supplied:	approx. 12,900 GWh annually, approx. 286,776 GWh since commissioning
Stud tensioning machine:	Supplied by STS predecessor in 1981



The Koeberg nuclear power plant and its surroundings are listed as a nature reserve (photo: Pipodesign – Philipp P. Egli)



The use of Siempelkamp stud tensioning machines in France was a good reference for the cooperation project with Koeberg NPP

## Herman Vervliet: Belgian, fan of South Africa, nuclear physicist – a part of Siempelkamp!



Hermann Vervliet is the Executive Director of MSDG

Herman Vervliet is 52 years old, and a Belgian by birth. He studied nuclear physics between 1979 and 1982 at the University of Hasselt (Mol campus).

Herman Vervliet has been working in the nuclear industry since 1983. He worked at the Doel and Tihange NPPs in Belgium, and at nuclear power plants in France. This was where he gained his initial experience in the nuclear service industry.

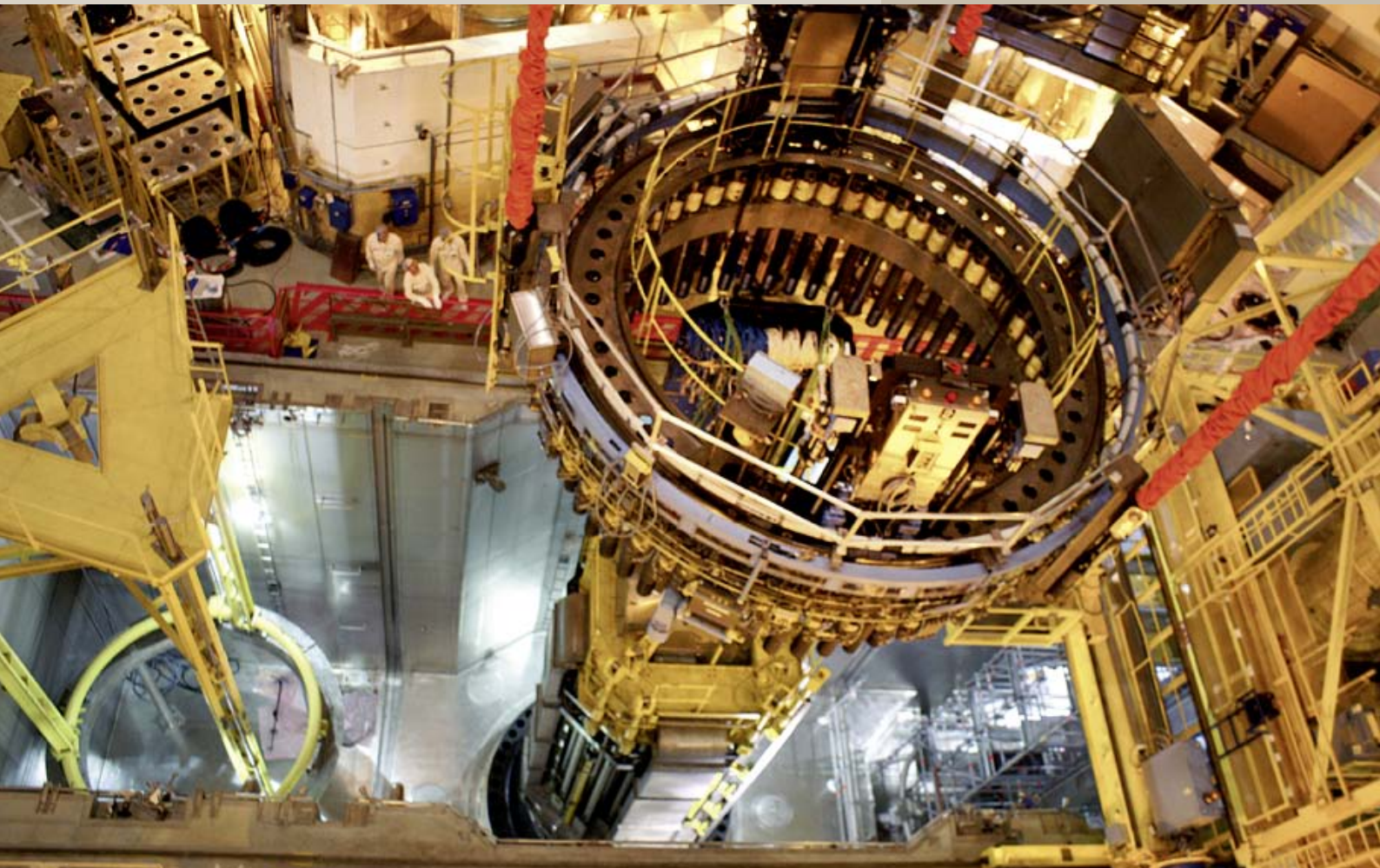
In 1992, Herman Vervliet moved to South Africa to fulfill his dream. At the Koeberg nuclear power plant, he worked in the maintenance department as the supervising head of department for primary system components. There he further improved his résumé through his extensive experience in service, in project planning, and using the Critical Path Method.

In December 2000, Vervliet moved to Siempelkamp MSDG, a subsidiary of STS. In 2001, he accepted the position of executive manager. He speaks Flemish, French, Afrikaans and English.

Today the Koeberg NPP acts as a base load power plant to supply the southern part of South Africa, and also exports power to Namibia and Angola. Due to economic developments at the Cape, the reliability of the power supply has become more critical. During the summer months, black-outs of multiple hours per day can be expected.

**1981: “Welcome to Siempelkamp expertise”: the stud tensioning machine**

In 1981, the predecessor company to what is today STS delivered a stud tensioning machine to Koeberg, together with the stud tensioning equipment for the steam generator and pressure vessel. The MSTM (= Multi-Stud Tensioning Machine) is used when replacing fuel elements. This process takes place at



The Siempelkamp multi-stud tensioning machine helps to massively shorten overhaul times in nuclear power plants

16-month intervals, and the MSTM is used to open and close the reactor pressure vessel (RPV).

How did the German product end up in South Africa? A good reference was provided by Framatome, today a part of the Areva Group. The MSTM systems made in Germany were successfully being used in the home country of the French nuclear power company, making this order from South Africa a logical consequence.

There are still employees from those days working for STS, some with more than 40 years of experience in the sale and servicing of stud tensioning devices. Even the first reactor tests, the cold hydro and hot functional tests, used the MSTM, under the then Head of Customer Service Hermann Schemberger (in retirement since 2008). After intensive training from customer service, the team at Koeberg NPP took the reins, taking over the operation and maintenance of the stud tensioning machine.

**Inspections: The time factor is increasingly important**

“It needs to be mentioned that 30 years ago, overhaul times of up to three months were common in South Africa. Back then, time was not seen as a critical factor, because the power supply of the country was secured by the coal-fired power plants,” explains Antonius Lanfermann, Head of Sales at STS.

Everything changed as the country developed, with the prosperous tourism industry and the growing middle class, developments that placed new demands on the power supply and its reliability. Today, overhaul times of just 30 days are standard, when fuel elements need to be changed, and maintenance work performed on the primary / secondary components. “The costs caused by the production downtime during a reactor



The multi-stud tensioning machine at the Koeberg nuclear power plant, South Africa



Stud tensioning machines are highly complex and impressive machinery

overhaul are enormous. Today, we therefore endeavor to keep overhaul times as short as possible,” explains Antonius Lanfermann. As a partner also for overhauls, the expertise of Siempelkamp came into play again in the mid-1990s.

#### 1995: Service and modernization – a pilot project

In 1995, the operator Eskom again contacted the manufacturer of its stud tensioning machine. The name of the company had changed, but the key personnel of today’s STS were still on board. An urgent machinery overhaul necessitated the deployment on short notice of a service employee; contracts were concluded for technical support during the overhauls.

During this period, close contact occurred between the then Head of Customer Service Hermann Schemberger and Herman Vervliet, who at that time was the departmental head of maintenance for primary components at Koeberg NPP.

New specifications for shorter overhaul times necessarily demanded shorter scheduled deployment times for the MSTM. Herman Schemberger supervised the deployments of the stud tensioning machine; after the machine overhaul, it was possible to reduce deployment times

and keep them consistent. The MSTM showed that, with intensive maintenance and inspection before deployment, it was a reliable machine. In the following years, Hermann Schemberger counteracted the aging of the components during his service visits – a further factor in the reliability of man and machine.

In 1995, a modernization project was prepared for the stud tensioning machine, which was implemented in 1998. The MSTM at the Koeberg NPP was the first stud tensioning machine for a 900 MW reactor made by Framatome to be updated in this way. In December 2003, this project thus served as a reference for the modernization of the stud tensioning machine at the Dampierre NPP in France.

What activities did the modernization focus on? The MSTM was given a modern control system, and the RPV studs were given two new stud driver devices. The pneumatic/hydraulic unit was replaced with a modern electro-hydraulic unit.

Furthermore, the MSTM was fitted with a new operator panel, with a programmable logic control system and a PC for visualization. The advantage for the operator is that the innovative machine control system reduced the deployment time and personnel requirements during the opening and closing of the reactor pressure vessel. After this modification, the MSTM again consistently operated without failures.

#### 2012: New modernization order for STS

Update follows update: in the following years, reactor shutdowns at the Koeberg NPP for maintenance work and overhauls continued to lead to supply bottlenecks in the power supply. These “blackouts” also affected the neighboring country of Namibia, which had concluded a ten-year

## Reference list “STS stud-cleaning devices”

- EDF, France: Dampierre NPP
- EDF, France: Chinon NPP
- EDF, France: Tricastin NPP
- EDF, France: Gravelines NPP
- EDF, France: Cruas NPP
- EDF, France: Chinon NPP
- EDF, France: Saint Laurent NPP
- EDF, France: Blayais NPP
- AREVA/CNPE, China: TaiShan NPP
- ESKOM, South Africa: Koeberg NPP
- Sweden: Oskarsham NPP (delivered in 08/2014)



A stud tensing machine under construction: for each one of the 58 reactor pressure vessel cover studs, two motors work together perfectly at all times



contract with South Africa for the supply of electricity.

“Just imagine, you’re in the supermarket doing your shopping, and you can’t pay because the power has failed and the checkouts aren’t working. So as a result you leave your shopping, and the supermarket closes,” explains Antonius Lanfermann.

Impressed by the way STS service engineers and technicians work, in 2012 Eskom ordered a further modernization of the MSTM in South Africa. The outdated single stud driver devices were replaced with double stud driver devices. In addition, the existing programmable logic control system was replaced with a new, faster control system. An expansion measurement system for 58 studs was added; older modules made way for new components.

**More reliability, lower costs: a new stud-cleaning device made by STS**

A further component of the 2012 order volume was an automatic stud-cleaning device from STS. Important factors in convincing the customer were references from French power plants, and the concept itself, i.e. cleaning the reactor pressure vessel studs in the containment area. One particular advantage stands out here: the risk of transport damage to the MSTM and the reactor pressure vessel studs during the transfer to the hot workshop disappears if the cleaning can take place directly in the containment area.

This immediately allowed the operators of the NPP to optimize the overhaul and transport processes, with time savings of ten hours in the overhaul sequence! Further advantages include reduced costs, e.g. for special transporters, and reduction of contamination risk for the cleaning personnel. “Stud threads used to be cleaned laboriously and by hand in the hot workshop. The new cleaning machine was a quantum leap forwards in terms of

safety. The threads are cleaned here automatically with a rotating brush head, while a suction system removes the hardened grease and other particles of dirt. The cleaning of RPV studs in a chamber sealed with Makrolon panels significantly reduces the contamination risk,” says Antonius Lanfermann.

Conclusion: French references, South African determination to innovate, German expertise, and good team-play between the partners formed the basis of a cooperation project that has kept all the participants together for 30 years. “Dankie” and “totsiens,” Koeberg!

# Six times 'First Board' in Russia/Belarus: A summary

The magical 'First Board' was produced at six locations in Russia and Belarus in 2014. This is reason enough to take a closer look at the day "X" in the life of a wood-based material production plant and to introduce the six recent projects which demonstrate Siempelkamp's market leadership in the region.

By Hans-Joachim Galinski

Whenever the deadline for the 'First Board' for a wood-based materials manufacturer is drawing closer, all involved parties become increasingly more tense: Will the plant concept, developed by different teams from different countries, work?

The sale of each wood-based material production plant is followed by a complex chronology of events including: concept development, project planning and engineering, design, development, shipping and installation. Different nations and correspondingly international teams with different skills come together to develop the product.

The 'First Board' is the accumulation of all individual factors working together and

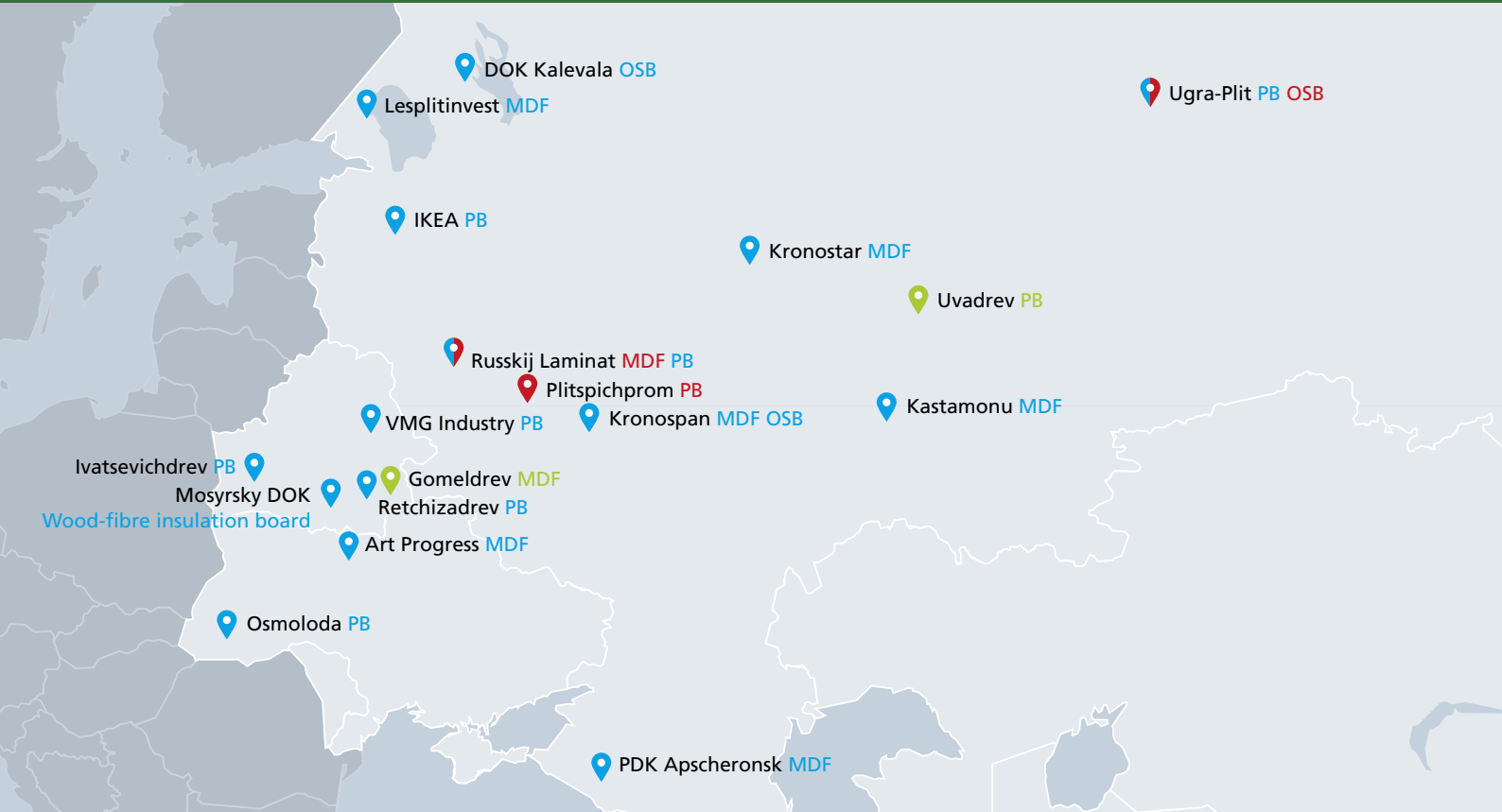
puts the entire concept to the test. Are the areas of mechanics, electronics, electrics and all other components perfectly attuned to one another? Does the plant meet the demands of the customer, for example, in terms of capacity or board density? If all these requirements are met on the day the 'First Board' is produced, it is a successful day for the manufacturer and operator of the plant.

Three Russian and three Belarusian customers celebrated the manufacture of their 'First Board' in 2014. These six Siempelkamp projects, which partly started with different conditions, achieved this milestone before full ramp-up and three-shift operation was reached. From market entry to production expansion, each operator pursues specific goals, however, they all have one common denominator: With Siempelkamp products all manufacturers built on the knowledge of the machine and plant builder from Krefeld which was able to assert itself either in tenders or against the competitors with its expertise. This is proof that Siempelkamp's market leadership in the Eastern European region remains unbroken.



Christening of the new ContiRoll® plant at Uvadrev

# Siempelkamp in Eastern Europe: successful partnerships from the former Tsarist Empire to the Russian Federation



- Prior to 1939 Russia was already one of the best customers of plywood presses and plants made by Siempelkamp
- After World War II the USSR ordered special presses for the aerospace industry
- Today the Eastern European business profits from an increasingly more important role of the wood-based material industry in Russia, Belarus and other countries
- When making the decision to buy a Siempelkamp plant, operators rely on matured technology and a tailor-made concept – this belief has prevailed in Eastern Europe!

- Existing plants
- Currently being installed
- Orders received

## Siempelkamp's results in Eastern Europe: ContiRoll® plants

Existing plants	Currently being installed	Orders received
15	2	3

## MDF plant for Apcheronsk: Olympic standard

<b>Location:</b>	Krasnodarskiy Kray, Russia
<b>Customer:</b>	ZAO PDK Apcheronsk (new Siempelkamp customer)
<b>Press:</b>	ContiRoll® 8' x 49.2 m with forming line
<b>Product:</b>	MDF
<b>Speed:</b>	1,200 mm/s (designed for)
<b>Board thickness:</b>	3 – 40 mm
<b>Capacity:</b>	1,000 m <sup>3</sup> /day at 16 mm
<b>Additional scope of supply:</b>	Project engineering, energy plant, dryer, finishing line and storage technology
<b>First board:</b>	August 2014

A Ukrainian company investing in Russia is supported by German technology: Siempelkamp placed an MDF plant with specific framework conditions in Krasnodarskiy Kray on the Black Sea, close to the Olympic city of Sochi. Due to the financial crisis the project chronology stretched over an extended period of time. The plant was designed for a special raw material: beech and oak wood which is expensive but readily available in the region.



Outside grounds



Cooling and stacking line



Signing of the contract



MDF fiber dryer



MDF former head



ContiRoll®

# MDF plant for Gomeldrev: the complete package

- Location:** Gomel, Belarus
- Customer:** JSC Gomeldrev – new in the field of panel production, but a big player in the wood industry with furniture plants, saw mills, dryer lines, match factory and veneer factory
- Press:** ContiRoll® 7' x 37.1 m with forming line
- Product:** MDF
- Speed:** 1,000 mm/s (designed for)
- Board thickness:** 3 – 40 mm
- Capacity:** 650 m<sup>3</sup>/day at 16 mm
- Additional scope of supply:** Project engineering, front-end equipment (debarker, chip production and storage, resin blending system), energy plant, dryer, all mechanic and pneumatic transports, Sicoscan measurement technology, finishing line and storage technology, short-cycle press including automatic paper pallet storage
- First board:** December 2014

This complete plant for MDF production is tailored to fit in the customer's existing infrastructure. Gomeldrev ordered Siempelkamp's complete concept ranging from the log feed to the sanding and packing lines. The result: A highly flexible production line designed for the manufacture of thin MDF, HDF and LDF which are used in the furniture industry. The company uses wood from the Aspen tree as the raw material for production.



Energy plant



Finished board stacking



Signing of the contract



MDF fiber dryer



ContiRoll®



Forming line

## Particleboard line for Retchizadrev: a customized solution

<b>Location:</b>	Retchiza, Gomel region, Belarus
<b>Customer:</b>	OSJC Retchizadrev
<b>Press:</b>	ContiRoll® 6' x 23.8 m with forming line
<b>Product:</b>	Particleboard
<b>Speed:</b>	600 mm/s
<b>Board thickness:</b>	6 – 40 mm
<b>Capacity:</b>	650 m <sup>3</sup> /day at 16 mm
<b>Additional scope of supply:</b>	Project engineering, chip production and storage, screening and separation technology, all mechanical and pneumatic transports, resin blending system, dryer, Sicoscan, finishing line and storage technology
<b>First board:</b>	February 2014

This plant for the production of particleboard has a very favorable location between Russia, the Ukraine and Belarus. Plant highlights include: This plant fits optimally into the customer's existing infrastructure. With this order Retchizadrev changes its production from multi-daylight technology to continuous pressing technology. The advantage: resource savings due to the ContiRoll®; lower board density with the same board quality.



Forming line with ContiRoll® (left)  
ContiRoll® press (right)



Signing of the contract (left)  
Outside grounds (right)



# MDF plant for Kastamonu: largest MDF plant in Europe!

- Location:** Elabuga, Tatarstan (Russia)
- Customer:** Kastamonu Entegre A.S., Turkish wood-based materials specialist and regular Siempelkamp customer
- Press:** ContiRoll® 9' x 55.3 m Generation 8 with forming line
- Product:** MDF
- Speed:** 1,500 mm/s
- Board thickness:** 4 – 40 mm
- Capacity:** 1,845 m<sup>3</sup>/day at 16 mm
- Additional scope of supply:** Project engineering, resin blending system with Ecoresinator, Sicoscan, energy plant and dryer
- First board:** May 2014

A reference project! This MDF plant meets specific requirements regarding the mechanical properties and board output. At high speeds it manufactures boards reliably and with a high quality. Kastamonu is a long-term Siempelkamp customer that has ordered almost all of its plants from the Krefeld manufacturer. The comprehensive scope of supply for this order ranges from the 85 MW energy plant, to the press line with Generation 8 ContiRoll® press, to the largest Ecoresinator to date with a throughput of 65 t of fibers per hour!



Fiber dryer (left)  
Forming line (right)



ContiRoll® (left)  
Outside grounds (right)

## Particleboard line for Uvadrev: complete with innovation booster

<b>Location:</b>	Uva, Russia
<b>Customer:</b>	Uvadrev Holding OAO, Russian wood-based materials specialist, new Siempelkamp customer
<b>Press:</b>	ContiRoll® 6' x 30.4 m Generation 8 with forming line
<b>Product:</b>	Particleboard
<b>Speed:</b>	650 mm/s (designed for)
<b>Board thickness:</b>	8 – 40 mm
<b>Capacity:</b>	950 m <sup>3</sup> /day at 16 mm
<b>Additional scope of supply:</b>	Project engineering, front-end equipment including chipper, silos, flakers, screening and separation technology, resin blending system, dryer, finishing line and storage system technology, sanding line. A highlight: the innovative particle forming station Ecoformer!
<b>First board:</b>	December 2014

Uvadrev enters into continuous production technology with this plant and doubles its capacity at the Uva location. The special feature of the particleboard plant: the particle forming station Ecoformer! Construction started in December 2012, when there were already freezing temperature prevalent – and adhered to an ambitious time schedule. Due to committed and streamlined Siempelkamp engineering, the foundation could be poured all the way into the winter. The order represents a jubilee: it is the 10<sup>th</sup> ContiRoll® on Russian soil – and the 20<sup>th</sup> press line in the CIS since the beginning of the 1990s.



Christening of the Uvadrev plant



Particle dryer



ContiRoll®



Signing of the contract



# Wood-fiber insulation board plant for Mozyrdoc: featuring high flexibility

- Location:** Mozyr, Gomel region, Belarus
- Customer:** Mozyrsky DOK,
- Press:** ContiTherm® in forming line
- Product:** wood-fiber insulation boards, rigid and flexible boards
- Board thickness:** 20 – 240 mm
- Capacity:** 1,078 m<sup>3</sup>/day at 160 mm
- Additional scope of supply:** Project engineering, front-end technology (debarker, chip production, resin blending system), energy plant, dryer, finishing line and packing line
- First board:** August 2014

Siempelkamp designed this plant for the production of high-quality rigid or flexible wood-fiber insulation board – the first one in Eastern Europe! The result: a multitude of board thicknesses, densities, and sizes. Furthermore, the plant can also manufacture flexible insulation boards by using two-component fibers. The manufacturing method is based on the ContiTherm® principle, a continuous calibration and hardening device.



Order sorting and packing system



Debarking plant



ContiTherm®



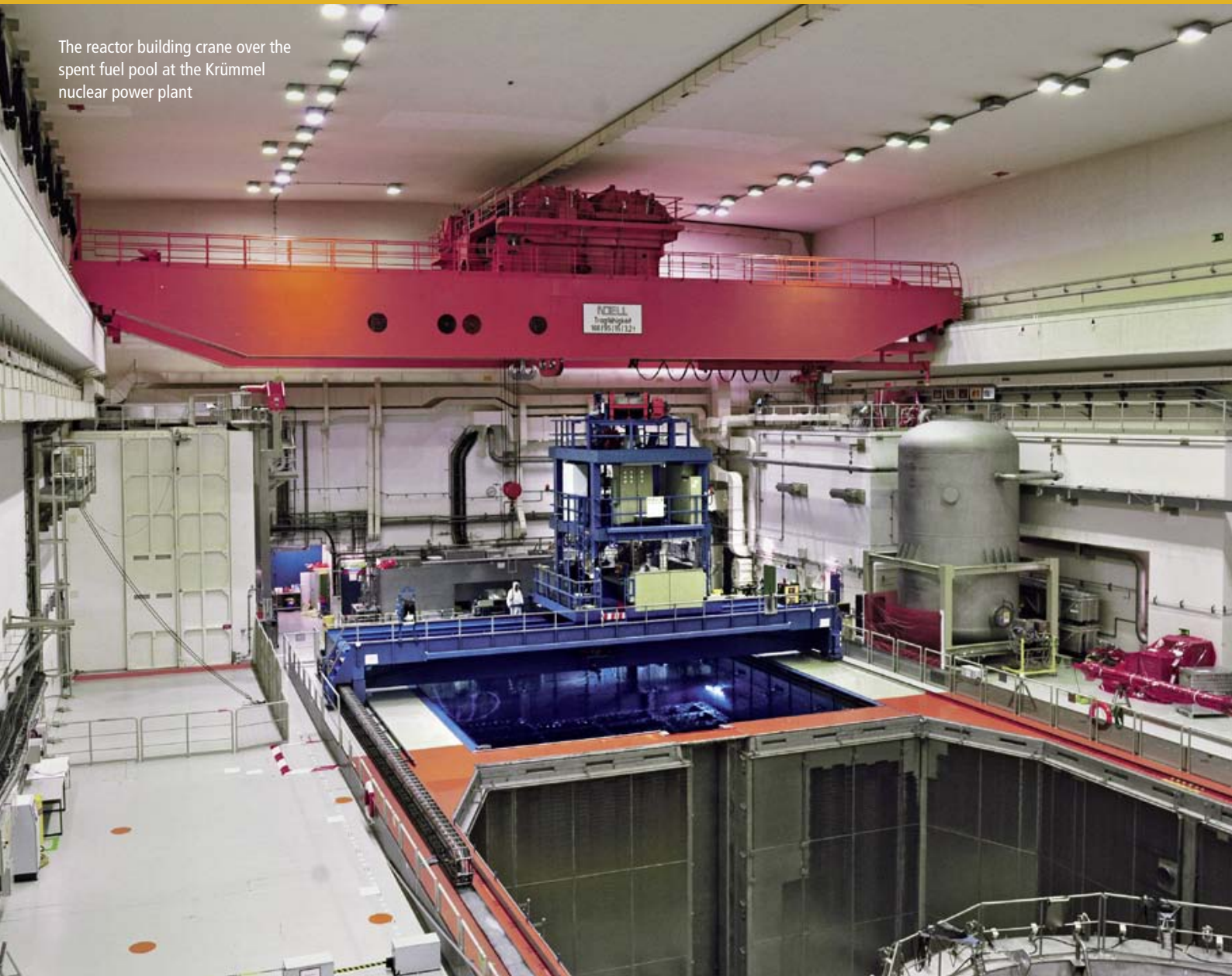
Cut-to-size line



Fiber dryer

# Siempelkamp decontamination facility for Krümmel NPP: Safe, solid, reliable during

The reactor building crane over the spent fuel pool at the Krümmel nuclear power plant



## Krümmel NPP: the key data

<b>Location:</b>	Geesthacht-Krümmel, southeast of Hamburg
<b>Operator:</b>	Kernkraftwerk Krümmel GmbH & Co. oHG (Owners: 50% Vattenfall Europe Nuclear Energy, 50% E.ON Kernkraft))
<b>Operational management:</b>	Vattenfall

**1984**

Krümmel goes on the grid as a NPP with a boiling water reactor

**2007 to mid 2009**

Offline

**December 2007**

Order for Siempelkamp for the replacement of a crane system



# the phase-out

After Fukushima it was clear that the Krümmel nuclear power plant in Schleswig-Holstein would not be going back on the grid. For Siempelkamp Nukleartechnik (SNT), however, the NPP remains a deployment location full of challenges. After SNT was given an order in 2007 for the modernization of a crane system, the experts from Krefeld received the follow-up order two years later for a decontamination facility with a wet box, dry box and ultrasound pool. The successful commissioning was scheduled for 2014. This project confirms that Krefeld is perfectly positioned for the phase-out of nuclear power plants in Germany!

By Liliane Walzel and Konrad Strein

Getting everything clean again: the dry box in front, the wet box in the back



In February 2009, Siempelkamp was awarded the contract for a full-service package in relation to the decontamination facility in the controlled area of the Krümmel NPP. Initially the dismantling of the old plant was scheduled, before the planning, manufacturing, delivery and assembly of the new decontamination facility followed, all from a single supplier, made by Siempelkamp.

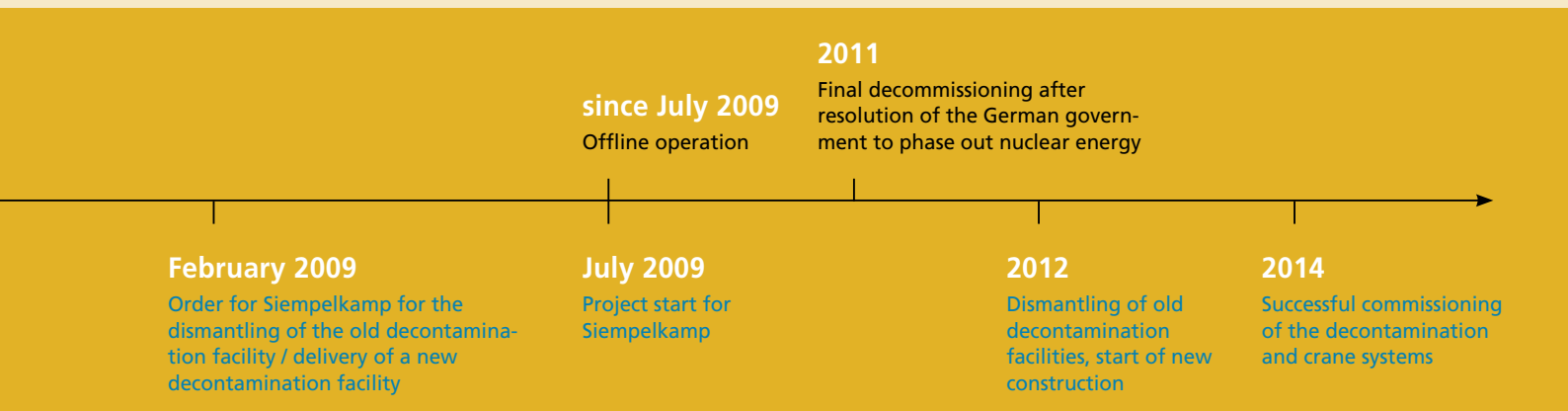
## Dismantling: all as planned

The project launch was marked in 2009 by the dismantling plan for the existing decontamination facility, in order to make space for the new, larger plant. The focus was on the dismantling of the components, fittings, piping, cables, and switch panels of the old system, and to record the disassembly potential. "The task was also to reduce removable fittings down to lattice box size. We also decided what dismantling tools should be used, and our tasks also included a ventilation and transportation plan," says

Liliane Walzel, Site Manager at Siempelkamp in Hamburg. This project module had already been completed by May 2009!

## Structural specifications: making way for the new

In the second stage, the task was to make structural changes at the Krümmel NPP, e.g. making large holes in the roof for the new decontamination cells. The new system additionally made it necessary to remove walls, enlarge holes, and conduct cutting work in the floor. Liliane Walzel explains, "For the installation of the components, we had to take a number of specifications into consideration. All components had to be arranged at ground level. It was also important to keep transport routes free, and to create a clear final visual appearance, without irregularities, not least because smooth surfaces are far easier to decontaminate than convoluted ones. Planning 'without edges and corners' is also part of our job."



## Decontamination facilities/cells: Squeaky clean!

The decontamination facility of a power plant is where decontamination work is performed. It cleans radioactive parts, e.g. piping, fittings, or entire machine parts. The options for subsequent application include reuse and reassembly, disposal using the waste systems, or conditioning as special waste. The decontamination cells included in these systems work using **wet and dry processes**.

**Wet decontamination cells** use high-pressure water technology. In the water-jet box, components are cleaned of oil and dirt. Crucial components include a high-pressure water system, air compressor, and ambient air and breathing air filtration systems; the treatment of wastewater is also part of the Siempelkamp scope of delivery.

**Dry decontamination cells** are used in the second stage. They clean structural elements and components made from e.g. steel or concrete using dry blasting processes, removing the thin outermost layer of steel. While the majority of the contamination is in the film of oil and dirt on the surface of the components, metal components can also have rough surfaces or small cracks that cannot be decontaminated in the "wash" process. The design includes compressed air supply and acoustic insulation; steel shot and glass beads are suitable for use as blasting material.

### Planning and assembly: building the decontamination facilities

After literally leveling the ground, the planning and assembly of the new decontamination facility took place, the main task of the SNT team. The order covered both a wet and a dry decontamination cell (see insert), and a cell with ultrasonic cleaning pools, including an access area. The assembly of the new decontamination cells began in April 2012, one month after the dismantling of the old facilities.

The dry decontamination cell was designed by SNT with an access airlock and a blasting material preparation system. A loading trolley delivers contaminated components into the decontamination cell. Here the surface of the components is removed using blasting granulate and 10 bar pressure. The granulate and the abraded material are carried through hoppers into the blasting material preparation system, where classifiers separate the blasting material from the abraded material. The targeted air flow then conveys the abraded material into the coarse filters. This is where the cycle is closed and the blasting material is fed back into the blasting process.



Components being cleaned in the wet box of the Siempelkamp decontamination cell



An employee blasts down a metal component in the dry box

"As an alternative blasting material, glass beads are available, which clean the surface less abrasively. The filtration process is unnecessary here, as the beads are collected in drums and disposed of together with the abraded material," explains Liliane Walzel.

### Cleaning with high pressure: the wet decontamination cell

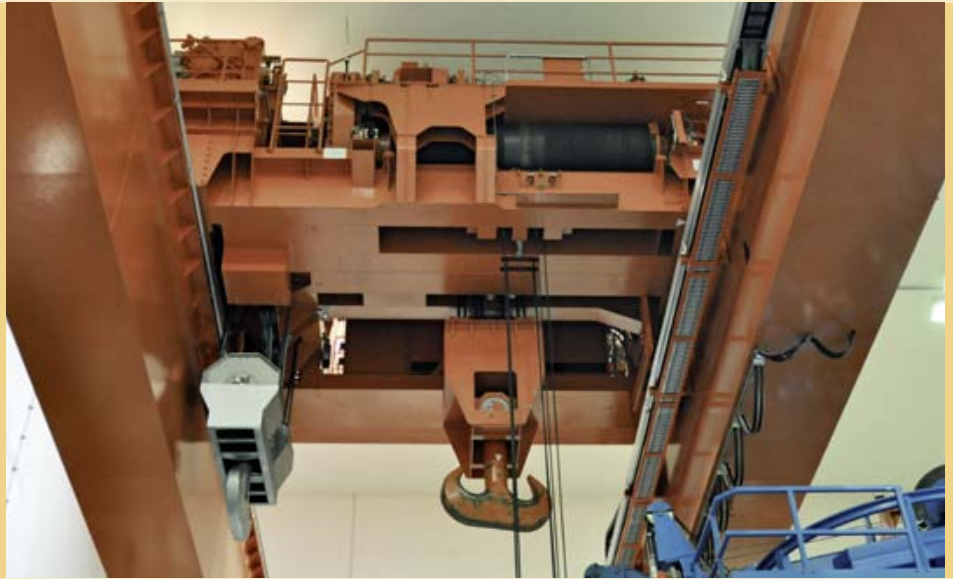
A high-pressure water jet decontamination cell with an access airlock and mechanical wastewater treatment is among the new facilities at the Krümmel NPP. As with the dry system, a loading trolley with a rotating working area delivers the contaminated components to the decontamination cell. In order to move components around within the cell, Siempelkamp planned and installed a 2t bridge crane with a manually operated chain hoist crane.

This decontamination cell variant does not use blasting material, but instead utilizes high-pressure cleaning. The blasting systems work at 160 bar and max. 80°C, or at 800 bar; corresponding accessories such as spray guns, high-pressure hoses, nozzles and hose rewinders are included in the design. The wastewater produced passes through funnels and into the underfloor



Inside the new Siempelkamp dry box

Siempelkamp modernized crucial functions of the crane system in the power plant building



channels of the wastewater treatment system, which has magnet systems and oil separators. The wastewater then flows into a collection tank, and is conveyed to an evaporator by a pump.

#### Ultrasonic cleaning and small parts cleaning system

In addition to the decontamination cells, SNT built a wet area with two ultrasonic cleaning systems at the Krümmel NPP. These allow smaller parts to be cleaned of contamination using ultrasound. This process is supported by a heating system. At operating temperatures of up to 80°C, components of max. 1,000 kg can be processed. This area is also equipped with a small parts cleaning system and a bridge crane for handling heavy components.

#### Ventilation concept with ambient air filtration systems

“Not without adequate, i.e. safe, ventilation,” is the maxim for the use of decontamination cells. At the Krümmel NPP, SNT incorporated two separate ambient air filtration systems into the planning. “The system for the dry blasting cell has an air throughput of 5,000 m<sup>3</sup>/h, while the one for the high-pressure water decontamination cell runs at 3,500 m<sup>3</sup>/h,” explains Liliane Walzel. The system is designed such that the air is extracted from the cells, cleaned by the filtration system, and returned to the room as ambient air. The ventilation system ensures targeted air flow. It assures an air exchange rate of approx. 80 ACH (air changes per hour) in the dry blasting cell, and approx. 50 ACH in the high-pressure water decontamination cell.

#### Modernization of the reactor building crane

Even before the decontamination facility, Siempelkamp was working on an order from 2007: the modernization of the reactor

building crane at the Krümmel NPP. The double-girder bridge crane operates using a trolley that includes the main hoist unit, special hoist unit, and auxiliary hoist unit. A horizontal traveling hoist is also attached to the bridge girder, the E-hoist.

When a NPP is in power operation, this type of crane is used to transport e.g. fuel elements, replacement parts, and auxiliary equipment for maintenance work. It is indispensable, even at an offline NPP: For example, it lifts CASTOR® casks loaded with spent fuel elements, heavy cover plates weighing up to 120 metric tons, and covers for containment or reactor pressure vessels.

At Krümmel NPP, the task was also to keep the existing crane up-to-date. SNT was thus given the order to modernize the entire electrical equipment of the crane system. This includes the switching and control system components, motors, brake switching elements, the cabling of the sensors for travel measurement and positioning, and all limit switches. The central trolley drive was replaced with two corner drive systems, allowing significantly more precise positioning of the crane! Furthermore, Siempelkamp delivered an additional visualization system, making it easier for the crane operator to select a specified position and to access information.

#### Final point of 2014: successful commissioning!

Both of the SNT projects in Krümmel have been completed in 2014. The decontamination facility and the crane system were successfully commissioned on schedule. Both are now doing their part towards ensuring the safe phase-out of the NPP.

Uwe Gradert from Vattenfall explains the advantages of the new decontamination cell from underneath the system

The inner life, the "guts", of the decontamination cell



Liliane Walzel, Site Manager for Siempelkamp in Hamburg

## Siempelkamp, Vattenfall, Krümmel: Three questions for project manager Liliane Walzel

**She has an insider's perspective on three organizations and three sets of tasks: Vattenfall, Krümmel and Siempelkamp: Liliane Walzel, Site Manager for Siempelkamp Nukleartechnik GmbH Hamburg since November 2013.**

Until 2010, the graduate engineer for process engineering collected experience as a project engineer on dismantling projects for SNT, and then moved to Vattenfall Europe Nuclear Energy GmbH, initially as a plant management assistant, and subsequently as the first female shift supervisor to be trained at Krümmel NPP. As a result of the Fukushima disaster, this training was never completed. She moved to the Project Management Office at Krümmel. In 2013 she went back to her roots, i.e. to the Hamburg offices of SNT. Liliane Walzel's expertise in the dismantling of nuclear facilities covers such aspects as technical implementation, radiation protection, occupational safety, and approval processes. Project management systems, e.g. for Krümmel, are also part of her profession.

For this crane technology expert, Krümmel is a known variable. During her shift supervisor training, she deepened her knowledge of the structure and operation of nuclear power plants with boiling water reactors. Since 2013, she has been working as a project manager at the plant site, coordinating the renovation of the electrical and control technology of the reactor building crane. As the link between the partners, she summarizes her experience for "Bulletin".

**Bulletin:** Ms. Walzel, you have first-hand professional experience of both the client and the contractor. Is there a common denominator in terms of teams, working practices, and performance expectations?

**Liliane Walzel:** The common denominator certainly is that they are both working

in the nuclear technology industry, with its special requirements and political factors. The same applies to the high standards set by the German nuclear regulatory authorities (KTA). The political effects of nuclear power being phased out in Germany represent difficult challenges for the client and the contractor alike, and require these companies to reposition themselves. This affects projects and project teams on both sides.

Ultimately, each team is dependent on its individual members. I knew both "teams", SNT and KKK/Vattenfall, before the project ever started. But it was still sometimes difficult to balance out differences in mentality between project participants from the north (Krümmel) and the south (colleagues from Austria). This meant my Austrian roots came in handy.

The decontamination cell area inside the Krümmel nuclear power plant



Siempelkamp modernized the crane system in the reactor building



The aim is always to successfully conclude a project, even when circumstances are sometimes difficult, so that the customer is satisfied with the result. The costs and compliance with schedules are also important criteria for both sides. One advantage of this is that working practices are increasingly being standardized and made more transparent using project management tools. This meant I was able to benefit both from my experience of project work at SNT and in the Project Management Office.

**Bulletin:** What did you consider the challenge in this joint project?

**Liliane Walzel:** The electrical and control technology for the reactor building crane at Krümmel was modernized in compliance with a new version of the KTA regulations issued by the German regulatory authorities. This entailed a number of technical challenges, all of which were ultimately solved.

It was a great challenge for me personally to jump into the middle of a project that already had a certain history. This was made easier by rapid planning of schedules, costs and resources, and corresponding internal and external com-

munication. At first it was a little strange to be coming to Krümmel as an "outsider". However, our familiarity with one another meant being on a team with my former colleagues worked well.

Over and above this, there were the standard challenges that occur on projects in existing nuclear facilities, e.g. satisfying the authorities and auditors during nuclear revision procedures; also dealing with inspection times that are never really fixed in advance.

This project was a modernization, a modification of an existing system. Work that can be performed at the factory when a new crane is being manufactured now had to be performed in the controlled area, including compliance with all regulations and plant rules for the NPP, and in particular in relation to radiation protection.

When problems occur, it is important that these are discussed in a constructive manner. This allows the joint development of a solution that the client will approve, and which we, the contractor, can implement at reasonable effort and expense. This was not always easy, but in the end we always found a common denominator.

**Bulletin:** Alongside inline skating and bicycle racing, your sporting hobbies include dragon boat racing. Are any of the fundamental principles of this sport transferable to the "Krümmel/Vattenfall/Siempelkamp" project?

**Liliane Walzel:** There are certainly some aspects of this very intense team sport that can be applied to project work. Once a project is underway, all participants are in the same boat. You can only reach the finish when everyone is working together "in the same rhythm", and with proper steering. As soon as someone breaks the rhythm, the boat slows down and the effort required to move forwards becomes greater. But this always applies to teamwork. There should also always be someone giving the rhythm, like the drummer in a dragon boat, so that the teamwork really works.

**Bulletin:** Thank you very much, Ms. Walzel, for talking to me!

290 t live weight ....



Transport of Nanshan presses:  
15,000 t on their way to  
Longkou, China



In May of this year Siempelkamp started what was probably one of the most spectacular heavy component transports from its own factory premises in Krefeld: The major part of the components for the largest closed-die forging press built in Germany to date with a pressing force of 50,000 t and a smaller 12,500 t press were transported to China. Up to now two partial shipments with 63 parts and piece weights ranging from 30 to 287 t have reached the port of Longkou, China, – on time and in sound condition. A third shipment bound for the customer's location left at the end of October. Installation of the 50,000 t press started according to schedule in October; installation start of the smaller press is scheduled for November.

By Ronald Hammerbeck

The order from the Chinese aluminum manufacturer Nanshan is considered noteworthy for Siempelkamp for several reasons: 1. – The 50,000 t closed-die forging press is the largest closed-die forging press designed and built by Siempelkamp experts in Germany to date. 2. – The casting of the 320 t bottom bolster for the press in Siempelkamp's own foundry is another world record. 3. – The transport of both closed-die forging presses posed special demands on Siempelkamp's logistics department, the involved freight forwarders and the responsible shipping companies. More than 63 parts including the foundation beams, top and bottom bolsters, the vertical frame components, the movable beam and bottom tables have already been shipped

with the first two transports. Another shipment with a similar volume is to follow so that, when complete, a total of approximately 15,000 t of freight including 150 sea containers with press accessories, tools, installation equipment were shipped from Krefeld to the customer's location in China.

#### Logistical masterpiece for the specialists from Siempelkamp

The oversized parts such as the bottom bolster for the larger press with a weight of 287 t or the top bolster components with a length of up to 11 m and a width of up to 7.20 m represented

## Review

In December 2012 the Chinese Nanshan Group commissioned Siempelkamp with the design, construction and installation of a 50,000 t closed-die forging press. In January 2013, Siempelkamp received another order, this time for a 12,500 t closed-die forging press. Both presses for the customer's location in Longkou, in the Shandong province, are the heart of a newly designed forging mill at a green-field site and will manufacture forged parts made of aluminum and titanium alloys for the Chinese aircraft industry.

A key reason for awarding the order to Siempelkamp was the company's convincing all-from-a-single-source concept. Siempelkamp was responsible for the design, the casting of the component parts, the machining processes, the transport of the parts, and the installation and startup. Siempelkamp is the only manufacturer of presses of this magnitude in the world which can offer customers this scope of supply.



... ready for transport

Sensitive operation ...



### First heavy component shipment:

Transport period: May 22 – August 10, 2014  
 Weight of parts: 30 t to 287 t  
 Total freight tons: approx. 5,500 t

### Second heavy component shipment:

Transport period: July 25 – October 18, 2014  
 Weight of parts: 30 t to 282 t  
 Total freight tons: approx. 2,500 t

### Third heavy component shipment:

Transport period: October 20 – December 29, 2014  
 (according to schedule)  
 Weight of parts: 45 t to 253 t  
 Total freight tons: approx. 2,800 t



particular challenges for the transport. Within the framework of the all-from-one-source concept, Siempelkamp's logistics department organized and coordinated this extraordinary transport of which the total cost amounted to 4.2 million Euros.

For some individual components the special handling already started inside the Siempelkamp Maschinenfabrik on the company's premises in Krefeld: All components with a weight above 200 t were initially positioned by a self propelled modular transporter in such a way that the loading of the actual transporter and the transport out of Siempelkamp's production facility became possible. Next, each component was loaded individually onto a heavy goods transporter. The towing and push-back vehicles, each powered by 680 horsepower – together weigh 70 t. On top of that are the trailer (50 t) and the press component part (max. 287 t), adding up to a maximum total weight of 400 t. For comparison, an empty A380 type 800 only weighs 275 t.

### From Krefeld via Antwerp to Longkou

From the Siempelkamp premises in Krefeld all press parts were transported to the nearby port of Krefeld. From there the parts included in the first shipment were loaded via a pontoon crane onto three different inland going vessels which started their journey on May 23. Two days later, in Antwerp, the cargo was reloaded onto a seagoing vessel. To do so onboard cranes were

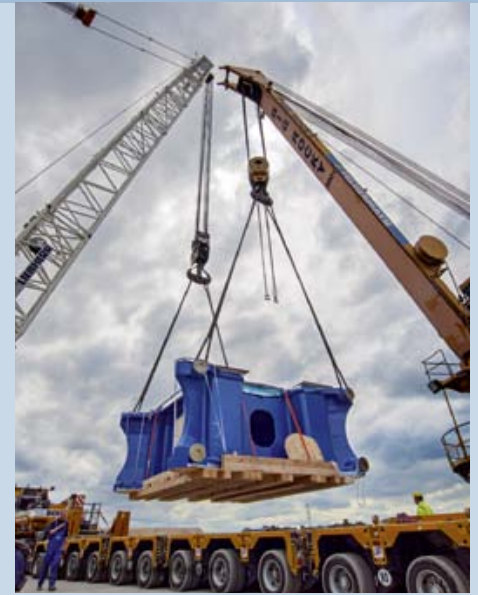
The boat is loaded



... and precision are the decisive factors during these transport tasks



The journey can continue



One crane alone is not enough

used. Also loaded were parts from sub-suppliers and press component parts which had already been delivered to the sea port. For the second shipment in August the heavy components for the press were lifted onto inland going vessels via two 650 t mobile cranes and then shipped to China via the same route. The transport of the third shipment took place at the end of October.

After the cargo arrived at its destination in China, the parts had to be loaded once again onto heavy goods transporters and then transported to the customer's premises 20 km from the port. This transport was also handled by the commissioned ocean freight forwarder and local partners. A self propelled modular trans-

porter was necessary for optimal weight distribution for component parts with a weight of over 200 t in order to cross an 80 m bridge. Prior to the transport, a statistical inspection of the bridge was arranged in order to convince the local authorities of the feasibility of the transport concept and the vehicle configuration. Each transport from the port to the construction site was accompanied by a large police escort. At the construction site, the parts had to be stored, according to their order of installation, until they were needed. The components of the third shipment are expected to arrive in December. Afterwards, the remaining component parts of the largest Siempelkamp press in the world will be installed.



Well packaged cylinders



Bulky and heavy

# Four questions for Ronald Hammerbeck, Logistics Manager at Siempelkamp



Ronald Hammerbeck

Loading at  
Siempelkamp



**Bulletin:** The transport volume for both Nanshan presses, their dimensions and weights turned the component transport into a challenging undertaking. What did your department have to place special focus on? What were the core issues?

**Ronald Hammerbeck:** For our team the project was and still is logistically difficult. The dimensions of the individual components with widths of up to 7.2 m as well as the extreme weights presented us with many challenges. A very long planning phase was necessary. The adherence to deadlines and the coordination with our partners and customers had to be flawless. Only in this way could all components arrive at the customer's construction site on time and in perfect condition.

**Bulletin:** What people and companies take part in such an extraordinary transport?

**Ronald Hammerbeck:** Three people from our logistics department were involved in the project. The freight forwarder, which carried out the transport from our

company's premises to the port of Krefeld, deployed more than 10 people for the Nanshan transport. Approximately 25 people worked for the ocean freight forwarder which took care of the shipment from the Krefeld port all the way to the customer's construction site. Finally, more than 40 people were involved in the continuous transport chain and were responsible for smooth processes.

**Bulletin:** Siempelkamp plans and supervises the transports of its own products. What characterizes Siempelkamp's logistics department? Why does it make sense for the press manufacturer to organize its own transports?

**Ronald Hammerbeck:** We know our component parts and their special characteristics and therefore, can determine the best possible logistical chain ranging from the packaging all the way to the transport. Our many years of experience in handling such large component parts allows us to recognize imponderables beforehand.

**Bulletin:** How do you make sure that customers receive their shipments quickly, complete and in perfect condition?

**Ronald Hammerbeck:** Our close proximity to the port of Krefeld helps us with the speed of our shipments. Here, parts with large weights and dimensions, such as the ones for both Nanshan presses, can be quickly and efficiently shipped via sea freight. Our close cooperation with freight forwarding companies and ocean freight forwarders plays an important role during this process. We work together with extremely reliable and experienced partners which use technically sound equipment and have very good references. This guarantees customers goods in perfect conditions. In order to ensure completeness, we use an innovative, self-developed barcode system which provides transparency from the packing of the parts to the acceptance of the goods at the customer's construction site.



Strothmann products for the automobile industry:

# Innovative handling technology for a new tandem press line

**When investing in a new press line or deciding for retrofitting an existing line, the plant availability is a decisive criterion when selecting a systems supplier. After all, no automobile manufacturer or supplier can afford production downtime. High plant efficiency through optimized energy consumption and low operating costs also play an important role in this decision making process. Top priority, however, is given to product quality because only high-quality equipment will produce high-quality products. Strothmann systems stand for quality, availability and efficiency. For these reasons, the Chinese customer Shanghai Superior Die Technology Co., Ltd. has recently ordered the newly developed HighSpeedTransfer from Strothmann for its new tandem press line.**

By Thomas Pieper

The order including the HighSpeed-Transfer represents Strothmann's largest individual order in the area of press automation on the Chinese market. For the new tandem press line for Shanghai Superior Die Technology Co., Ltd., Strothmann will supply the entire parts handling including a blank feeder with a fully automatic tooling change system, the new HighSpeedTransfer which is based on servo linear technology and the finished part removal at the end of the press line. The HighSpeedTransfer is a further development of Strothmann's proven CompactTransfer which was developed for press retrofits.

## Tandem press line with new HighSpeedTransfer

For continuous operation the press line is equipped with two de-stacking stations. A

proven safety concept allows such operation and prevents danger to the operators. The loaded blank carts are transported on Strothmann RoundTracks® to the de-stacking stations. The carts feature lifting apparatuses which adjust the stack height mechanically. An air knife for aluminum or a fanner magnet for steel blanks separate the blanks for automatic de-stacking inside each station.

Two SRLM-2/120-type feeders unload the blank carts with a combined 18 strokes per minute and place the blanks onto a conveyor belt. Double blanks are automatically detected and discarded. The correctly de-stacked blanks are transported on conveyor belts through a blank washing machine and lubrication system and finally to a centering station where the HighSpeedTransfer picks them up and places them into the first press.

## Maintenance-friendly and flexible

During product changeover the tools of the de-stacking feeders can be automatically switched out. A tool changing tower which can accept up to three press tools moves to a defined transfer position. The feeder opens the coupling and places the tool into the empty position. The tower then moves back to the transfer position and allows access to a new tool that the feeder can pick up.

The HighSpeedTransfer is mounted in production direction onto the press bolsters. It is very compact and easily accessible – all component groups are mounted above floor level. Neither counter balance tanks nor supply lines are installed inside the press pit. This significantly reduces the time needed for maintenance. The available space is used to change the

The HighSpeedTransfer (HST) during testing ...



## Shanghai Superior Die Technology Co., Ltd.

With over 1000 employees, Shanghai Superior Die Technology Co., Ltd. is a competent developer and manufacturer of tools in the automobile industry. The company was founded in 2004. Modern equipment and production facilities offer many professional manufacturing capabilities and make Shanghai Superior Die Technology Co., Ltd. a much sought-after partner for the automobile industry. The company, which is part of a group of companies with HASCO and SAIC Hong Kong Co., Ltd., is certified and has won many awards.



... at the technical center in Krefeld



... and at the customer

## Front of Line (air knife for aluminum or fanner magnet for steel blanks)

### Technical Data:

<b>Throughput:</b>	15 strokes/min
<b>Blank size:</b>	4,100 x 2,100 mm
<b>Max. acceleration:</b>	Horizontal axis 25 m/s <sup>2</sup> Vertical axis 15 m/s <sup>2</sup>
<b>Distance between press tables:</b>	6 m
<b>Load:</b>	120 kg (blank + tooling)



transfer tooling, mounted on the die carts, allowing for an automatic tool change during the die change process.

Four linear axes and one rotating axis, each with its dedicated drive, enable the HighSpeedTransfer system to execute extremely flexible orientation functions to transport parts from one press to another. The last transfer places the finished part directly onto the outfeed conveyor.

The tooling is attached to the crossbar which, due to its carbon fiber construction, is very light. The crossbar is the only component of the Strothmann system which passes through the area between the press tools. The connectors for the crossbar are suspended on two pivot joints at the X2 carriage plate. The tools stay connected – during a tool change the entire crossbar is automatically switched out. For a quicker tool change the two-piece bar is fitted with couplings. The crossbar was developed using the latest calculation models (FEM), tested via vibration analyses by the Fraunhofer Institut für Werkzeugmaschinen und Umformtechnik (IWU) (Fraunhofer Institute for Machine Tools and Forming Technology) and finally brought to series-production readiness.

### Control for plant automation

The HighSpeedTransfer was designed for tandem press lines. Each transfer works independently, however, is electronically connected to the adjacent presses. In cooperation with the parent company, Strothmann developed a new control concept for this Transfer-Automation system. For its implementation, standard hardware components were used. The automation concept can be used with all relevant press controls. An automatic tooling change for any stage is also planned. Strothmann supplies the control for the HighSpeedTransfer with nine





HST

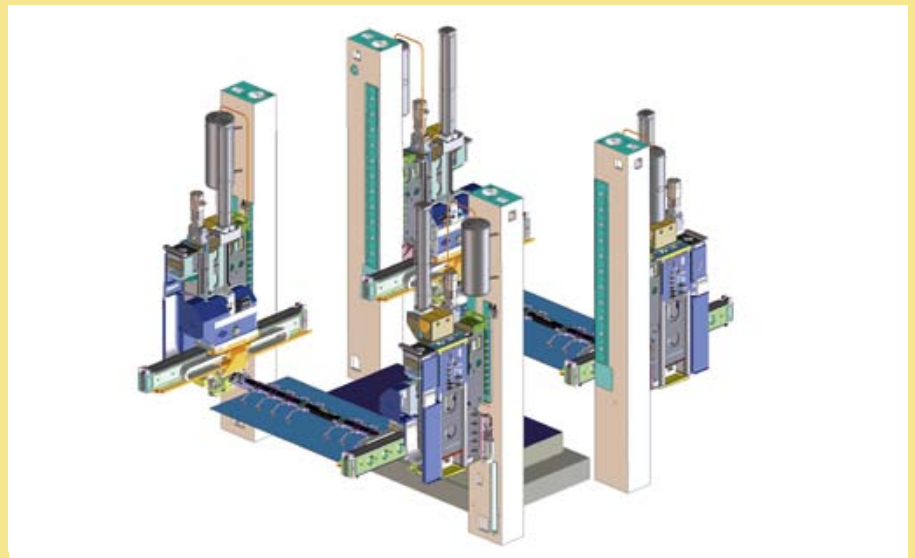
pre-programmed base curves. A base curve can be assigned to each tool set and adjusted in the necessary position zones via a mobile control unit. In this way, a quick production start is ensured even with new tool sets.

The tool-specific settings are stored and processed in a recipe management system. Next to simple and user-friendly operation, another focal point during development was an integral energy concept with a shared supply of energy for press and automation. By connecting the intermediate circuits, higher energy efficiency is achieved. Another advantage is the upkeep of the energy supply for the automation in the event of failures. In this way collisions are prevented.

With the HighSpeedTransfer by Strothmann Shanghai Superior Die Technology Co., Ltd. will be able to manufacture high-quality tools economically and efficiently.



Tandem press line with HST



HST

## Advantages of the HighSpeedTransfer

- suited for tandem press lines and retrofits
- servo linear technology
- newly developed control by Strothmann with Siemens components
  - all component groups located above floor level
  - mounted directly onto the press bolster
- excellent accessibility
- safety through redundant systems
- exclusive use of standard parts of well-known manufacturers
- carbon-fiber reinforced crossbar is suspended on two pivoting axes
  - rotatable up to 6° around A
  - rotatable up to 180° around B (for automatic tooling change)



Siempelkamp Logistics & Service GmbH:

# Siempelkamp service joins forces



One company, three locations in Germany, over 100 employees and concentrated service competence: That describes Siempelkamp Logistics & Service GmbH (SLS). Managed by the two directors Stefan Wissing and Thomas Dahmen, SLS joins forces at the locations in Bad Kreuznach, Wolftratshausen and Krefeld for optimal customer support in the area of after-sales service. Since it was founded in 2010, the company has grown steadily – beginning with the merger of the service departments of Metso Panelboard GmbH in Hanover and Siempelkamp Handling Systeme (SHS) in Wolftratshausen and finally, with the integration of the service employees of Siempelkamp Maschinen- und Anlagenbau GmbH in Krefeld. The positive customer feedback demonstrates that the concept of having an independent service company works.

By Dr. Stephan Niggeschmidt

## SLS locations in Germany



Since it was founded, SLS has multiplied its order volume. Due to attractive pricing, the company secures shares in business even in areas where alternatively industrial wholesale could take over.

Many plant operators trust in all-round service by Siempelkamp and buy 70 to 80% of their spare parts from the “Original Equipment Manufacturer” (OEM). This is a very pleasing result which demonstrates the trust of the customers in Siempelkamp competence beyond new plant business. To achieve this result, SLS not only improved its organization but also focused on steadily developing its products and services.

### One partner for all services

The 100% subsidiary of Siempelkamp Maschinen- und Anlagenbau GmbH provides all-round service to customers worldwide. SLS not only supplies spare parts but is also responsible for their installation at the customer’s plant. Furthermore, SLS plans and carries out retrofits and upgrades for existing presses and plants. Three locations, each with particular main tasks, as well as their intense collaboration with each other and with all international service offices ensure an even quicker, more effective and flexible service while providing fair pricing. Another advantage: Customers worldwide have to contact only one service provider. All offers and orders are handled on behalf of Siempelkamp Logistics & Service GmbH, regardless if the particular contact is located in Bad Kreuznach, Wolftratshausen or Krefeld.

## Siempelkamp Logistics & Service GmbH, Bad Kreuznach

Siempelkamp's subsidiary Siempelkamp Logistics & Service GmbH started its business activities in Bad Kreuznach in 2010. As the headquarters and the location where SLS was founded, the Bad Kreuznach location is the specialist for quick original spare parts service. Here, specialists are responsible for the standard spare parts business and the logistical processing for the entire SLS as well as the Group-internal processes in the areas of purchasing and logistics. The proximity of the location to the Frankfurt airport, the largest and most important re-loading point for air freight in Europe and the highway network near the hall exit provide excellent logistical conditions for supplying spare parts quickly. The "known consigner" certification considers any air cargo shipment from SLS as safe and allows the transport of the spare parts from the warehouse directly to the airplane and thus eliminates time-intensive, elaborate and costly security checks at the airport. The storage hall capacities in Bad Kreuznach provide excellent conditions for a well-stocked spare parts inventory. In addition to Siempelkamp presses, SLS also supplies spare parts for presses made by Küsters, Metso and Bison.

SLS in Bad Kreuznach is the right contact when high-quality spare parts directly from the press manufacturer and at an attractive price are needed quickly.

**Established:** 2010

**Branch manager:** Carmen Lorch

**Main task:** To provide original spare parts for presses made by Siempelkamp, Küsters, Metso and Bison as well as service logistics



*Carmen Lorch, branch manager SLS Bad Kreuznach: "Our spare parts team's personal commitment, our experienced logistical processing as well as a steadily growing stock of spare parts allow us to supply urgently required parts in time critical situations as quickly as possible to our customers."*



Employees of SLS in Bad Kreuznach

## Siempelkamp Logistics & Service GmbH, Wolfratshausen

Regarding services in the area of finishing lines, SLS in Wolfratshausen is the right contact. Created from the service department of the former company Siempelkamp Handling Systems, the specialist for components in the area of board finishing continues to provide the expertise of the OEM.

Next to upgrades of electrical controls, new controls for trimming and cross-cutting saw units as well as modernization packages for transfer carts (new cable drums for the satellites), SLS in Wolfratshausen also offers the general overhaul of double diagonal saw mechanics as part of a service package.



*Dr. Frank Otto, branch manager SLS Wolfratshausen: "Due to the optimal composition of our service team, we can provide broad and, at the same time, extensive know-how for finishing lines. Because of it, we can react to customer requests extremely flexible, at short notice and at a high technical level."*



<b>Established:</b>	2012
<b>Branch manager:</b>	Dr. Frank Otto
<b>Main task:</b>	Spare parts, retrofits, upgrades and installations in the area of finishing lines

## Siempelkamp Logistics & Service GmbH, Krefeld

If the required spare parts could not be identified or questions regarding the need of spare parts arise, customers worldwide can find support from the employees at the Krefeld location. Furthermore, the Krefeld portfolio includes upgrades and retrofits. SLS specialists support customers with the project planning, the entire processing of the project, all the way to the implementation of a customer's individual solution. The proximity to the parent company allows close cooperation between of the design engineers of the OEM and the SLS project managers. Our service specialists support customers worldwide with upgrades and retrofits, repair and maintenance tasks as well as during trouble-shooting. The supreme objective is to carry out whatever task necessary as quickly as possible and with high quality so that once the equipment is re-started, stable production resumes.

According to the motto "only Siempelkamp knows Siempelkamp's equipment best" the expertise of the press manufacturer guarantees the customer to have selected the best partner for the project. The knowledge about presses made by Küsters, Bison and Metso is also concentrated at the Krefeld location. No matter whether it concerns upgrades to continuous presses, multi-daylight presses or short-cycle presses, with the technical knowledge of SLS's Krefeld location, proven plants are brought up to date.

<b>Established:</b>	2013
<b>Branch manager:</b>	Dr. Stephan Nigggeschmidt
<b>Main task:</b>	Spare parts that need to be identified, retrofits, upgrades and worldwide service for all areas other than finishing lines



*Dr. Stephan Nigggeschmidt, branch manager SLS Krefeld: "Next to the spare parts business, our focus in Krefeld is on the sales and processing of upgrading and retrofitting projects. By working closely together with the technical departments of Siempelkamp's machine and plant engineering business unit, we can provide customers with the best possible support. If the customer should need additional support during maintenance tasks or production downtimes, our service specialists can be on site quickly."*



Managers of SLS Krefeld



Employees of SLS in Krefeld



Storing, order sorting, shipping

### Networked around the globe

With its teams at the locations Bad Kreuznach, Wolfratshausen and Krefeld, SLS can provide the technical knowledge for all service tasks regarding wood-based material production plants installed worldwide. After the startup and acceptance test of a plant, SLS is the long-term partner for customers and completes Siempelkamp's "all from a single source" concept with the area of after sales service. In all areas of the service chain, SLS convinces with speed. This includes a quick response to customer requests as well as speedy procurement and delivery of the spare parts.

Another advantage: The international service offices in France, Spain, Turkey, Russia, China, Singapore, India, Australia, North America and Brazil use the same central ERP system as the German SLS branches. This means all service locations are networked in the best possible way and together provide even more speed and efficiency during order processing.

### Transports to customer sites around the globe

In addition to after-sales services, SLS is the logistics provider for the Siempelkamp Group. The tailor-made logistics concepts include the organization and implementation of the complete logistics' chain from the worldwide suppliers to the customers' plants. In the area of new plants SLS provides the logistics for the Siempelkamp production locations abroad ranging from the timely purchasing to the professional packaging, the selection of the appropriate modes of transport to the monitoring of the transport chains. To do so, the company works together with long-term forwarding agents and other service providers. SLS also offers support regarding the documentation and customs clearance in the country of destination.

A computer-assisted monitoring system, developed by SLS for the logistics department responsible for new plant business, provides a transparent representation of the supply chain starting at the production location and ending at the construction site. Furthermore, this system ensures the construction site storage organization and the support of the installation system.



Markus Dös with computer for warehouse organization at the construction site



Service specialists at the customer's site: P. Kurczyk, M. Macha, M. Mewes, U. Panyo and G. Krabes (left to right)

## SLS service offices



### The course is set for the future

To optimize further future activities of SLS, the management and employees of SLS together defined a new service strategy for the company last year. Improvement measures were developed which primarily addressed expanding the product portfolio, increasing the spare parts inventory, optimizing organizational processes as well as innovative service solutions. The measures were prioritized and first projects have meanwhile been implemented. Within the scope of an international service meeting the worldwide service subsidiaries were also integrated into this concept.

This will ensure that SLS will be the first contact for customers around the globe when it comes to services regarding wood-based material production plants in the future.

“Even if we have already achieved a good level, we must increase our efforts and implement the developed measures in order to improve service in the long term,” explain managing directors Stefan Wissing and Thomas Dahmen. “Our new service strategy provides the appropriate foundation to do so.”

Managing directors SLS Stefan Wissing and Thomas Dahmen

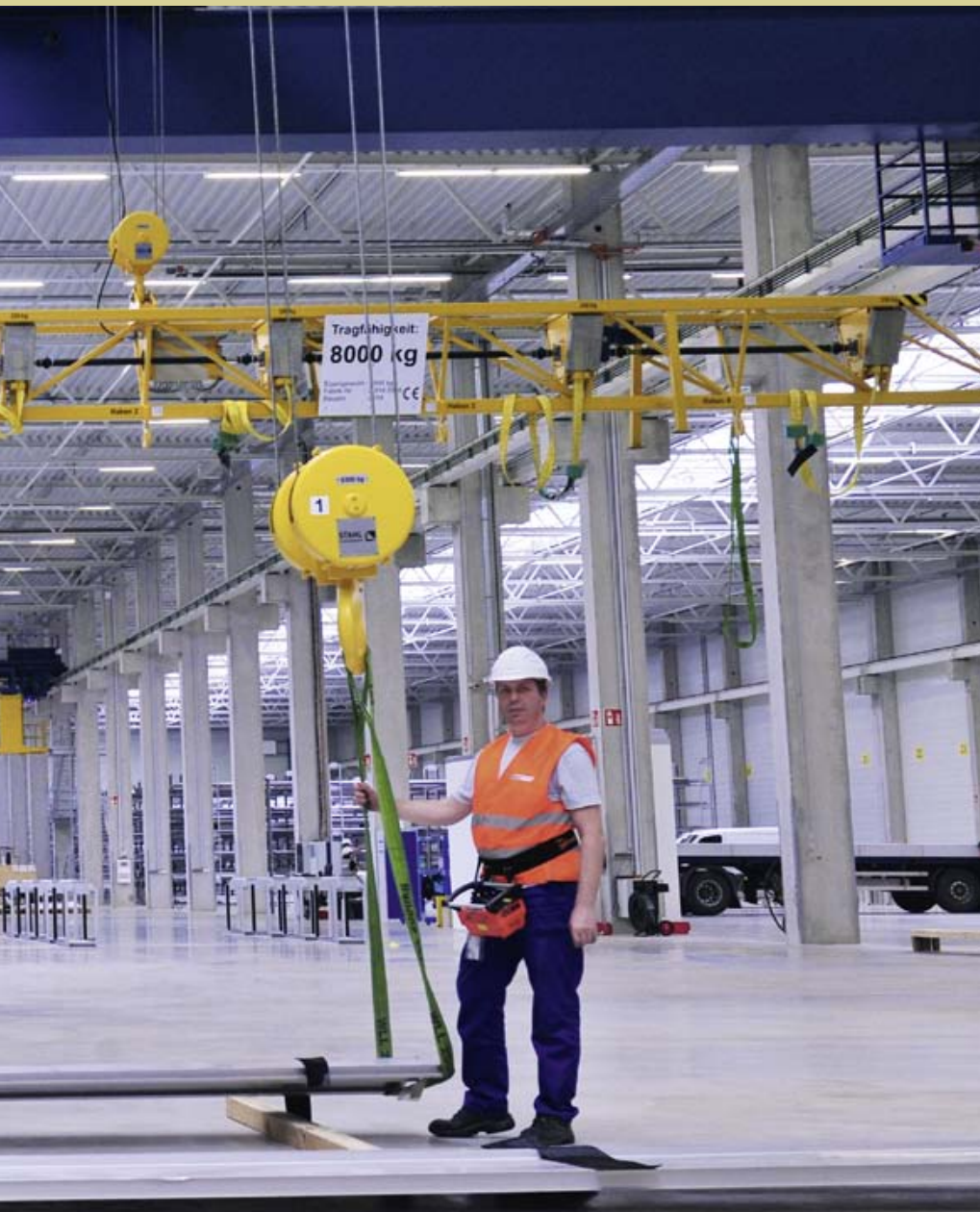


The new storage hall has multiple Siempelkamp crane systems, and is designed as a two-bay hall



From the coast to the Rhine:  
Siempelkamp Krantechnik gets  
high-tech rail vehicles moving





**Siempelkamp Krantechnik (crane technology – SKT) is a valued supplier, and not only within the Siempelkamp Group. Other Krefeld companies are also impressed by the expertise of the special crane builder. A sophisticated crane system for a new warehouse and logistics concept was a big hit at Siemens AG in Krefeld-Uerdingen in August 2013.**

By Ute de Vries

Siemens AG has taken advantage of the attractive location between the big cities of Düsseldorf and Dortmund. The company has been manufacturing rail vehicles in Uerdingen for decades, and has developed this site into one of the rail industry's most important centers of expertise.

The Siemens "Rail Systems" division is a leading international supplier of rail vehicles and related maintenance services. Its headquarters are in Berlin, with a business unit located in Krefeld. The rail system portfolio covers the entire range of rail vehicles, from railways and underground railway systems and locomotives to trams and metropolitan railways. The division produces reliable rail vehicles that provide its customers with an economical service while simultaneously protecting the environment and saving resources.

The Rail Systems division is divided up into three business units: One of them, "High Speed and Commuter Rail," has its headquarters in Krefeld. Around 2,000 employees are employed there in developing and manufacturing commuter, regional, intercity and high-speed trains. This includes regional trains such as the Desiro® and high-speed trains such as the ICE; and more recently the Velaro D®, a further development of the ICE 3 trains.

**Construction project: What is needed is sophisticated crane technology**

At the beginning of 2014, a new warehouse and logistics center was built in Krefeld-Uerdingen, consolidating the existing warehouse and logistics processes from the Siemens site. Two logistics buildings took shape: a warehouse for short parts receives the parts being delivered (e.g. seats), which are later installed in the trains at the factory. The

long-parts warehouse is used for the storage and handling of long parts for use, including shell construction components made of aluminum, with lengths of up to 28 m.

This is where Siempelkamp comes into play: a sophisticated concept for crane systems was needed. For the special crane builder Siempelkamp, this meant the implementation of the highest standards under conditions that were not always ideal. Many interfaces had to be taken into account; the solution was influenced by a variety of parties that needed to be coordinated. "A significant number of stakeholders and their interests had to be reconciled here, e.g. those of the customer, the warehouse manufacturer, and the warehouse operator, the latter of whom was the logistics contractor and responsible for smooth everyday operation. Last but not least, there were the software companies who are entrusted with inventory

management. This is because the warehousing concept stands or falls with the crane technology," says Heinrich Kampen, Managing Director at SKT.

The challenge was to perform the design, production, supply and installation of a total of five special crane systems of three different types, with the aim of implementing the logistics concept in the two-bay long-parts section of the warehouse.

#### Five cranes, three crane types, one overall concept

The concept begins with delivery of the long parts by truck. To unload up to nine trucks per day, two double-girder bridge cranes are available, each with two crane trolleys and a load capacity of 12.5 metric tons, and equipped with calibrated crane scale systems. The crane control systems are controlled remotely. The trolleys are

controllable individually, or in tandem mode, via selector switches.

After unloading and the incoming goods inspection, a further two cranes take over the order-picking process for the long parts and their delivery for in-house use. The crane operators control their cranes from a ride-on crane cab.

The long parts are stored in a special storage system, known as storage cradles. These are transported and stacked with the help of the cranes and the associated load lifting devices. For this reason, this type of crane is equipped with special load spreaders for the attachment of the cradle crossbeams that handle the storage cradles. Three details ensure that the loads are put down with millimeter accuracy: 1.) frequency-controlled movements, 2.) cable pulls without hook movement, 3.) a positioning system, combined with an electronic oscillation damping system.

The third type of crane takes over other tasks within the logistics concept: It includes a rotating mechanism and a 22 m-long load spreader with integrated load turning units. The span distance of the crane system is 29.65 m, and the working height of the crane systems is about 9.0 m. Work on the contract began for the SKT team at the end of August 2013. The operational handover of the systems was carried out on schedule in February 2014.

#### Special crane equipment: Always a solution

All crane systems have to be designed for each warehouse bay such that their control and safety technology is interlinked. This was achieved through collision protection between the cranes, supplemented by a user ID for the crane control system, using **key authorization technology**. User identification utilizes login

## Light work for the crane operator

The long-parts warehouse of the new Siempelkamp crane system consists of 20 rows, each with six stacked cradles, in which material up to 28 meters in length is stored. The entire long-parts warehouse is controlled and managed using a Siemens ERP system. The warehousing and retrieval orders for the long-parts warehouse are generated in the ERP system. All orders from the ERP system are sent to the Unix computer of the Siempelkamp crane system, and from there are sent to the crane via WLAN. The operator of the crane receives the order on a 19-inch monitor, and now has to start the order handling using a confirm button. The crane travels to the storage location sent by the ERP system in fully automatic mode. Another confirmation from the operator is required there: Can the hoisting gear be lowered? Upon confirmation the package is automatically picked up by the crane, and moved to the release position determined by the ERP system. Here the crane again waits for confirmation from the operator: Can the package be placed down? After the package has been deposited, the hoisting gear returns to its upper limit position and waits for a new order from the ERP system. The Siempelkamp crane system is ready for its next task. The advantages are obvious: the special software automates routine procedures for the operator, without losing control of the crane.



Long aluminum parts being suspended from the crane



Long parts up to 28 meters in length can be moved quite easily by the crane



Rotating the aluminum part around its long axis is no challenge for the Siempelkamp crane system



The new crane system can even rotate the 28-meter long parts around their own axis inside the hall

cards, so-called "smart cards". This enables the identification of the operator and the personalization of the radio remote controls. In this way, the control system is protected from unauthorized users; safety-related functions are enabled only for an authorized group of people.

All cranes include a **load spectrum recorder**. This records the actual period of use and determines the remaining service life of the hoisting gear. The device records use on the basis of the load cycles performed, as well as the actual loads on the hoisting gear. The calculated values are

saved by a power failure-proof method, and can be accessed at any time using a PC.

Further details: The crane systems controlled with a crane cab include a **two-way radio connection**. The employees in the warehouse communicate with the crane operator in his cabin via headsets.

The type 2 cranes are equipped not only with a positioning system, but also with an **electronic oscillation damping system**: A synchronization control system (electronic wheel flanges) always ensures exact 90°

positioning of the crane bridge relative to the crane runway. At the same time, a camera system detects incipient oscillation or rotational movements of the load, and counteracts the crane and trolley in such a way that these movements are compensated for immediately, ensuring the load is transported without oscillation at all times.

The two unloading cranes work with **calibrated crane scale systems**. The double rail trolleys are designed with double frames. Load cells and weighing terminals integrated into the double frames measure the suspended loads with



Picking up long parts is precision work for crane operators



Tough straps are placed around the long parts



Each strap is closed and secured



The 28-meter long part has to be secured and fastened every four meters



The crane operators check the fastenings are secured

an accuracy of  $\pm 0.2\%$ , displaying the value to the operator via a large load display.

In the event of issues with a crane, **remote maintenance modules** provide immediate assistance to diagnose the problem. The order-picking cranes include a **visualization and control unit** that is connected to the warehouse management computer. Both storage areas are mapped on a separate PC. The crane control system communicates with the PC via radio link.

### Systematic warehousing

The individual storage areas are clearly marked according to the area and row, and the number of stacking cradles per stack is predefined. Each storage location is marked as occupied or free. In the initial position, the crane waits without any load and with the hook in its top position.

When the target coordinates are entered, the crane moves to the defined storage location. There the storage cradle is picked up manually. After the hoisting gear has been moved back to the highest hook position, the crane moves to the next storage location when new target coordinates are entered. The load is put down either manually or by means of a semiautomatic process.

The storage areas themselves are not subject to safety monitoring, and all movements can therefore only take place

after confirmation by the crane operator. Throughout the entire period of operation, a confirmation button has to be held down on the radio transmitter (dead man's switch). If the crane is operated exclusively in manual mode, the coordinates are subject to continuous automatic analysis, and the stacking operations in the control system are tracked. In this way, an up-to-date warehouse image is always being created.

The special load-bearing unit on the crane allows up to three layers of cradles to be picked up with a single lifting process, one on top of the other. This reduces the stacking operations that are required.

### Moormerland is getting closer and closer to Krefeld

The Siempelkamp company comes from the region between the River Ems and the North Sea coast, and since 2014 its ingenious crane system has been operating at the new warehouse and logistics center of the Rhineland city of Krefeld-Uerdingen. We look back on a successful reference project at Siemens AG, and yet another project completed in Krefeld.

Our conclusion: Crane technology from the coast is getting rail transport moving in Krefeld – a gratifying project between Moormerland and Krefeld!

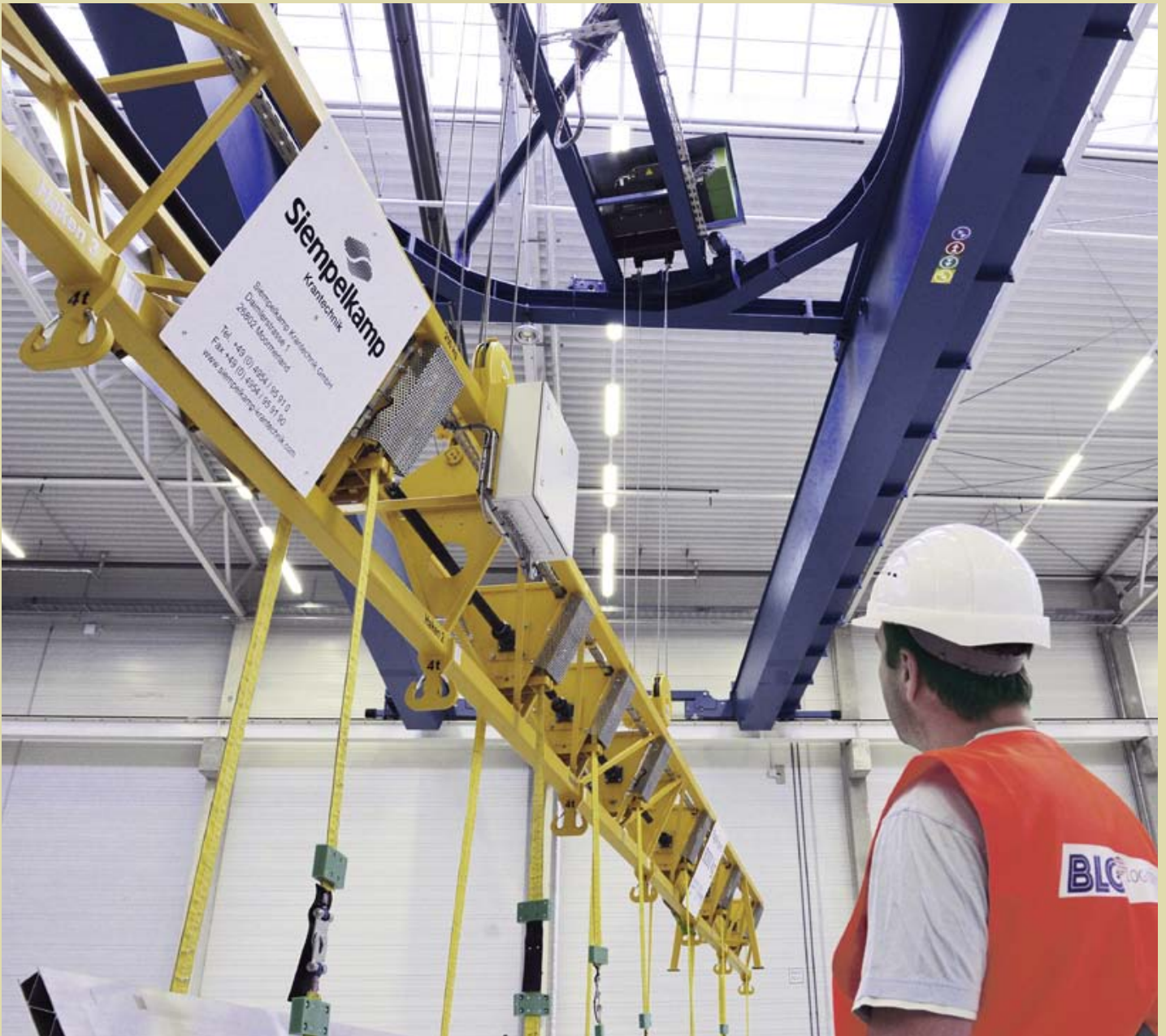


The securing and fastening of the long parts requires precision



Everything has to be perfectly secured and fastened

The crane operator looks at the complex structure of the Siempelkamp crane system



The Siempelkamp crane system waits for its next task

The customer was convinced by the new Siempelkamp crane system

Production competence: Machine Factory:

# Siempelkamp – Hot platen



Final machining

It is the product that started Siempelkamp's history and it is the heart of the proven ContiRoll® press. It is also one of the components within the machine factory with the highest vertical range of manufacture. The Siempelkamp hot platen! Whether as a component for a new plant, as a spare part or as a part of a modernization package: Siempelkamp hot platens always impress with high manufacturing quality and provide the best product properties for wood-based material or rubber presses. Since 1883 – the year the Krefeld company was founded – the hot platen is a symbol for Siempelkamp's production know-how.

By Andreas Freis

# manufacturer since 1883

Over 130 years ago Gerhard Siempelkamp founded the company based on an idea he had: He started to supply hot platens to the Krefeld textile industry which could be directly heated through channels drilled into them. Shortly after, Siempelkamp specialized in the manufacture of hydraulic presses and opened up new markets in the wood-based material, rubber and plastics industries. Today, Siempelkamp experts design and manufacture hot platens according to the latest technology.

## New plants, spare parts business, upgrades

The proven hot platen is a component of each continuous press made by Siempelkamp. It features high steel and surface quality as well as excellent dimensional tolerances. A special manufacturing process allows Siempelkamp to drill channels with high accuracy resulting in a uniform channel system inside the hot platen. The design of the channel plugs allows for even distribution of stresses. For Siempelkamp customers this translates into stress-free pressing with uniform temperature distribution on the product. The pressure-resistant and reliable hot platens have a long life-span and ensure economic production.

Customers that invest in new plants aren't the only ones that benefit from these advantages. Siempelkamp hot platens also play an important role in our spare parts business and in upgrades and retrofits. These services include the spare parts service for existing plants, repairs and modernizations of field-proven hot platens (electrical, hydraulic, mechanical), the repair of hot platens in customer plants on site, hot platens for third-party presses, technical and technological consulting or simply the thermal insulation of the platens. This comprehensive range of services regarding hot platens is preceded by a long Siempelkamp history which reaches all the way back into the 19<sup>th</sup> century.

## From the textile to the wood-based materials industry

In the early 1880s Krefeld's textile industry was booming. The city was famous for the elegant, pearly sheen of its fabric. To give the Krefeld textile its irresistible shimmer, presses with hot platens were needed. During his employment at Rheinische Röhren-dampfkessel-Fabrik A. Büttner & Co., a factory that produced steam generators, the young metalworker Gerhard Siempel-



Straightening press



Pre-milling



Pre-machining



CNC deep hole drills



Notches and pockets



Welding



Finished side

kamp learned about a technical invention: a heatable steam press platen, which was made of a piece of solid wrought iron or steel and through which hot steam was channeled. For many years, platens used for hot pressing were heated over an open flame, a procedure that was both laborious and above all unreliable. By the 1870s, these solid platens had been replaced by hollow platens with integrated steam pipes. These platens comprised two pieces of sheet steel that were either welded or riveted together and were used in hydraulic presses. The problem with the new steam press platens was that they were not sufficiently robust: rolls of fabric left dents in the sheet steel, the pressure of the steam sometimes caused it to bulge outwards, and steam often escaped at the rivets.

To begin with, the Siempelkamp founder Gerhard Siempelkamp developed a special hot platen channel drilling machine that allowed heating channels to be drilled quickly and accurately into the solid platens using flat drills and, at a later date, twist drills. This was the starting point for the industrial production of steam press platens. In 1883 Siempelkamp began selling his self-designed steam press platens. Soon after Siempelkamp specialized in the manufacture of hydraulic presses and opened up new markets including the wood-based materials industry as well as the burgeoning plastics and rubber industries.

#### How does the Siempelkamp hot platen work?

With the drilled hot platen Gerhard Siempelkamp developed an innovative product for his time which had a simple operation. While then the hot platens were heated with superheated steam, today a special thermal oil is used as the heat transfer medium. For the ContiRoll® pressing process it is heated to approximately 270 °C. Because the oil has a maximum operating temperature of 320 °C, the process temperature is way below the boiling point. Thus, evaporations and combustions, along with the contaminations they create, are prevented. The thermal oil is pumped, using pumps which were designed to withstand the high temperatures, out of a boiler, passes through pipes by a flame and is thus heated. By the time it is entering the channel system of the hot platen, it has cooled down to 250 °C. Due to the continuous flow, the hot platen material heats up extremely evenly.

Up into the 1980s multi-daylight presses were built where the heat is directly transferred from the hot platen to the product. In today's continuous presses the heat is first transferred from the hot platen to the roller rod carpet and then to the steel belt. The steel belt transports the formed particle or fiber mat with speeds of up to 2,000 mm/s through the press and transfers the optimal





Applying pressure and rinsing



Rust-proofing

temperature for the pressing process to the product. Upon exiting the hot platen, the thermal oil, meanwhile cooled down to 230 °C, flows back into the boiler where the cycle starts again.

#### **Production of a Siempelkamp hot platen: First step – surface machining**

Siempelkamp's machine factory in Krefeld is the only manufacturing facility in the world for the Siempelkamp hot platen. The high quality of the hot platen is primarily due to the use of a highly wear-resistant material which complies with Siempelkamp standards and is ordered according to special guidelines with the relevant inspection certificates. In the last 130 years Siempelkamp has also consistently developed the special pre-treatment of the raw material. A special milling process using ceramic milling tools for a high surface finish is used. The low-stress machining of all sides is also carried out according to Siempelkamp standards and is based on many decades of experience. After machining, the plan parallelism and smoothness of the hot platens amounts to +/- 0.1 mm.

#### **Second step – Deep hole drilling, welding, finish-machining and installation**

The mechanical precision of the channel systems is achieved with special deep drilling units which drill the channels into the unfinished platens uniformly and with low tolerance exactly at the centerline of the platen. This ensures even heat distribution. Special channel deflectors, which ensure minimum resistance at

extremely high flow speeds, have a positive effect on the heat distribution.

The deflection and sealing systems of the Siempelkamp hot platens are then, in one sitting, completely welded through via submerged arc welding. This method allows for thermal stresses to be absorbed better during future heating and cooling processes.

The finish-machining takes place almost stress-free with highly precise surface machining systems with magnetic clamping plates. The continuous inspection of the surfaces ensures the quality of the hot platens during this production step. Finally, the hot platens for the ContiRoll® are pre-assembled and equipped with pipe connections, insulation cassettes and functional elements. Prior to their delivery they are pressure-tested with a multiple of the operating pressure and the data resulting from this process is logged.

Because of the comprehensive production know-how they are based on and the high quality demands for their production, Siempelkamp hot platens remain the guarantee for high-quality products in the wood-based material and rubber industries and are therefore in demand by customers worldwide as a component for their continuous press line or multi-daylight press.

Successful startup of a closed-die forging press at JSC Metallurgical Plant Elektrostal:

# Lord of the rings

In July JSC Metallurgical Plant Elektrostal (Elektrostal) in Russia celebrated the inauguration of its 20,000 t closed-die forging press for the production of ring blanks. The press is part of a new factory which allows the customer to carry out the complete production process for rings made of steel and special alloys for the aircraft industry. Siempelkamp's machine and plant engineering business unit was the main supplier for this large project and not only supplied the closed-die forging press but also developed, designed and built its first ring-rolling mill which started operation in October. Currently, Siempelkamp is upgrading the customer's existing 4,000 t open-die forging press which is also used for ring forming processes. With this complete concept Siempelkamp proves once more its competence as a complete supplier in the area of metal forming which does not shy away from new challenges.

By Emilien Collard



Dr. Fehner and S. Mondal with personal awards from Elektrostal during the opening ceremony



Siempelkamp received the order in 2010

4,000 t forging press prior to the upgrade



Water hydraulic unit during testing

In November 2010 Electrostal ordered from Siempelkamp a 20,000 t closed-die forging press for the production of rotationally symmetric parts made of nickel-based superalloys. In March of 2011 the order for the corresponding ring-rolling mill followed. Furthermore, Electrostal commissioned Siempelkamp with the upgrade of its open-die forging press. As part of a large project, all three machines are set up in the Russian plant of this supplier of the aerospace industry. Next to discs and shafts, the production line allows Electrostal to carry out the entire manufacturing process for rings beginning with the melting of the metal, to making the preliminary products, all the way to the rolled ring. Product diversification and quality open up new markets for the customer in the aerospace industry.

### Upgrade by Siempelkamp

The latest component of the order is for Siempelkamp to retrofit the customer's proven 4,000 t open-die forging press. In addition to open-die forging, the press will also be able to carry out closed-die forging processes after the upgrade and can thus be regarded as a multi-function press. Siempelkamp's scope of supply includes, among other things, a device for the centering, lifting and depositing of workpieces as soon as these are moved under the shifting table. Next to new seals for the main cylinders, a swinging arm for the introduction of the punching tool is part of the upgrade package.

Furthermore, Siempelkamp will overhaul the water hydraulic control of the press. With the new control Electrostal achieves a  $\pm 1$  mm tolerance with the movable beam during the pressing

process. The new component parts will lower the customer's energy consumption while, at the same time, increase machine availability. By installing redundant hydraulic systems, the safety standards of the plant are increased. Many manual adjustments will be simplified by automatic processes in the future. This saves time and prevents errors. Furthermore, the Siempelkamp control ensures high repeat accuracy and immediate adaptability of the production process: Prior to the actual forging process, a work-piece-related speed curve can be programmed, stored and retrieved at a later time for the production of individual products. Additionally, during forging a report of the achieved values is generated and archived. The simple error selection minimizes the maintenance effort.

## Multi-function press at a glance

<b>Press capacity:</b>	4,000 t
<b>Stroke:</b>	2 m
<b>Press speed:</b>	max. 40 mm/s
<b>Forging dimensions:</b>	max. diameter 800 mm max. weight 600 kg

## 20,000 t closed-die forging press during development



Machining of a table segment



Transport of a table segment



Complete press table



Lowering of the table segment



Mounting of press pistons



Press shell



Hydraulic units

## Siempelkamp – the specialist for forging presses

For the manufacture of high-strength ring blanks Siempelkamp supplied a new closed-die forging press to Electrostal including the complete electrical and hydraulic systems. Two robot manipulators, which were integrated by Siempelkamp, are responsible for the loading and unloading of the press. The scope of supply also included a tool heating system which keeps the upper and lower die at a constant 800 °C between forging processes.

## Tool heating system for high forging precision

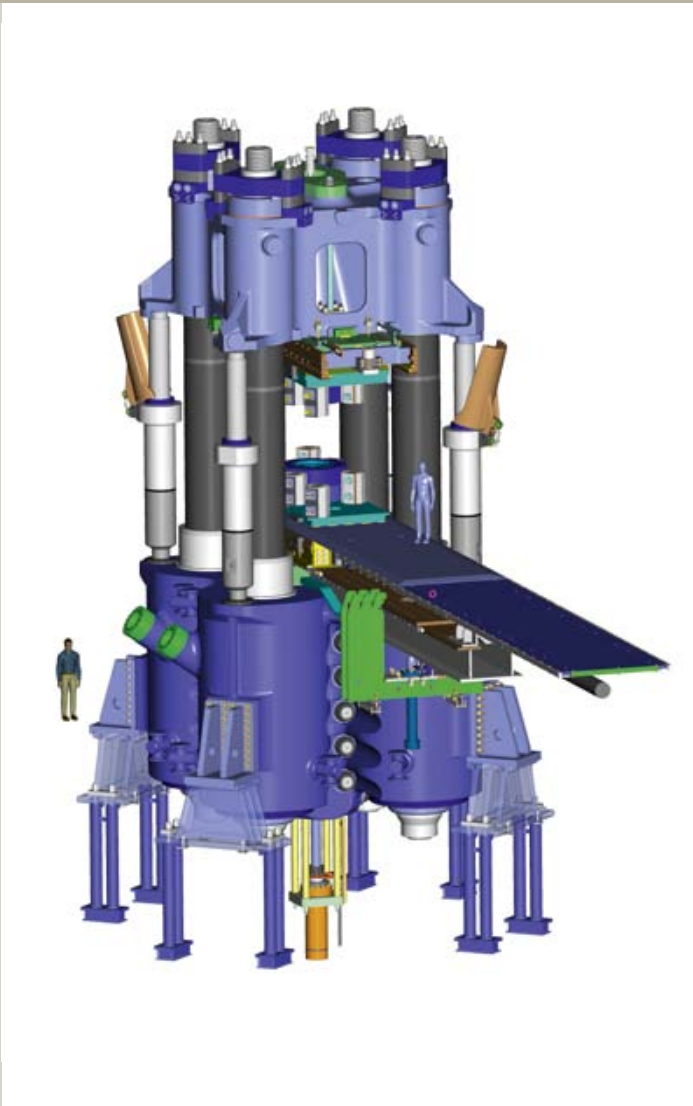
The new forging press is the first one of this size with an integrated tool heating system. In this way, high precision is achieved even for difficult to forge materials such as Inconel. With the press Electrostal will manufacture, among other products, creep-resistant forgings with lengths of up to 1,200 mm and widths of 800 mm. At a weight of up to 800 kg the parts have to withstand thermal stresses in aircraft turbines and power plants.

## Closed-die forging press at a glance

<b>Press capacity:</b>	20,000 t
<b>Daylight:</b>	4 m
<b>Stroke:</b>	2 m
<b>Forging dimensions:</b>	max. length 1,200 mm max. width 800 mm max. weight 800 kg
<b>Tool heating system:</b>	800 °C



20,000 t press ready to start operation



Design of 20,000 t press



First pressing tests

Due to the fact that forgings have to adhere to very tight dimensional tolerances, Siempelkamp placed special emphasis on precision when designing the guide elements. Heating during forging of highly sensitive materials such as aluminum or nickel-based alloys is absolutely necessary. The forging process is only possible during a short temperature window – if the tool is too cold, the material will crack. The Siempelkamp heating system prevents such manufacturing defects and thus increases plant outputs. In addition, the forming speed can be adjusted to the process. This results in near net-shape parts and high repeatability of the product quality.

Another special feature: The press was designed as a pull-down press. Because of it the customer did not have to adjust its

existing halls and face the numerous administrative requirements that would accompany a retrofit. A special challenge was that the height of the press could only be 9 m above floor level due to an existing crane track. Furthermore, the moving beam of the forging press is connected to four annular pistons ( $\varnothing 1,600$  mm/P max. 350 bar) each via four columns. The pistons are positioned in the cylinders inside the lower beam. The four columns, pre-stressed by means of tie rods, serve for power transmission. The hydraulically-operated automatically adjustable press guiding system is disconnected from the elements of power transmission. This prevents mutual influences of power transfer and guiding system. The Siempelkamp scope of supply for the closed-die forging press also includes the loading and spraying robot as well as a manipulator.



Product of the closed-die forging press for further processing on ring-rolling mill  
(test phase)

Shell of ring-rolling mill at Elektrostal

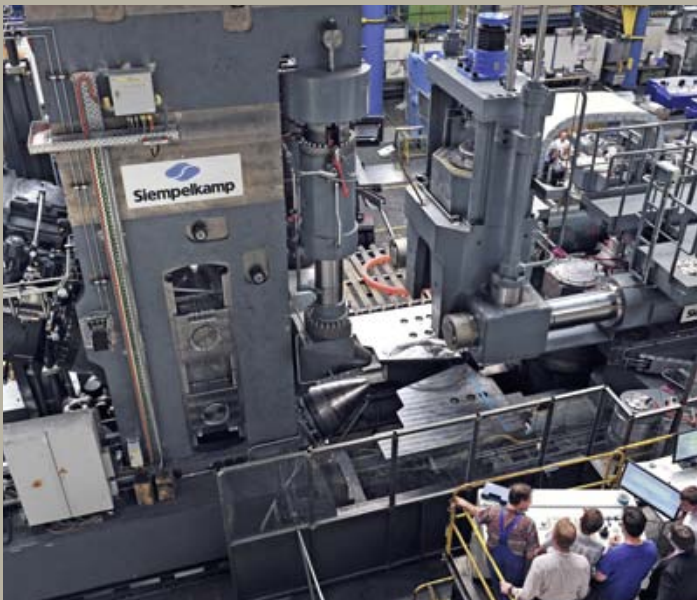


### Siempelkamp's first ring-rolling mill

To support the customer with the final production step of making rings, Siempelkamp developed its first ring-rolling mill which was started up in July 2013 inside the Krefeld production halls. Roughly two years after the contract signing, this startup represented the highlight of the project "ring-rolling mill". In October of 2013 the machine was dismantled and transported to the customer in Russia.

Apart from machines and process technology regarding metal forming presses, Siempelkamp now also offers technology for further processing. And Siempelkamp does this on a large scale. With maximum radial and axial pressing forces of 6,300 kN each, the ring-rolling mill is one of the largest of its kind worldwide.

To test the machine, the Siempelkamp experts in Krefeld manufactured several rings with different dimensions using the hot-rolling process between July and October 2013. The mill was



Ring-rolling mill during testing at Siempelkamp in Krefeld

## Ring-rolling mill at a glance

<b>Ring dimensions:</b>	Maximum diameter 4,000 mm; Height 40 to 600 mm
<b>Rolling force:</b>	Radial 6,300 kN; Axial 6,300 kN
<b>Drive capacity:</b>	Main roll 1,260 kW Axial roll 2 x 630 kW Total approx. 3,200 kW
<b>Roll speed:</b>	Control range 0.3 – 1.2 m/s Rated speed 0.7 m/s
<b>Diameter:</b>	Mandrel rolls 200 mm – 400 mm Main rolls max. 1,500 mm
<b>Axial rolls:</b>	Angle of taper 2 x 22.5°
<b>Travelling distance:</b>	Upper and lower carriage of the mandrel roll 1,100 mm Axial frame 5,000 mm
<b>Dimensions:</b>	Main dimensions approx. 22,000 mm x 6,500 mm

initially designed to produce rings made of steel and special materials such as nickel-based, titanium and aluminum alloys with a maximum diameter of 2,500 mm. During the testing phase in Krefeld, the maximum diameter was extended to 4,000 mm; the maximum ring height is about 600 mm.

The ring-rolling mill is equipped with numerous technical innovations allowing high operating precision and product quality. The machine frame is designed in such a way that it can absorb all forces and torques produced during the rolling process. Thus, extensive foundation work at the customer's site does not apply. The roll gap is adjusted by means of hydraulic cylinders which guarantee high positioning accuracy and compensate the expansion of the axial frame. The axial rollers are furthermore equipped with wear caps. These caps can be replaced quickly which makes the time-consuming disassembly of the axial rollers for the re-machining of the surfaces unnecessary.



SicoRoll control

### Precise and individual rolling processes with SicoRoll

Next to the rolling mill, the scope of supply for Electrostal also includes the complete hydraulic system, the automation system as well as the newly developed SicoRoll control. The program determines the relevant rolling parameters using a database which stores the tool and material data as well as the common rolling curves and strategies. The user can also enter or add data about rolling processes. This open structure allows the customer to have an extensive influence on the rolling process. The calculated rolling parameters are transmitted to the machine control. Thus, SicoRoll ensures the optimal ring-rolling process and synchronizes the parameters with the process. The entire process is recorded, analyzed and archived completely by Siempelkamp's in-house documentation system DAHMOS.

### "All from a single source" is a proven concept

Siempelkamp's complete concept allows the Russian customer Electrostal to carry out the complete manufacturing process for rings ranging from the forging of the preforms, to the manufacturing of the ring blanks, to the ring-rolling process. Once more, Siempelkamp's "all from a single source" concept has proven itself. Regardless of whether it concerns product development, new plant or upgrade: Siempelkamp is the right partner when it comes to getting the most out of metal forming presses.

When demolishing a nuclear power plant, everything is precisely planned and marked out, ...

# Project analysis for the dismantling of nuclear plants: From cost calculation to holistic controlling

Since 1976, Siempelkamp NIS Ingenieurgesellschaft mbH has specialized in calculating the costs for the dismantling of nuclear plants and the disposal of the dismantled components. Over the last four decades, this sector has developed to become very sophisticated. Recently, the dismantling of nuclear facilities has developed from a technical challenge into a subject on the public agenda. Reason enough for the Siempelkamp subsidiary to increase the complexity of its thinking and activities.

By Peter Petrasch

Throughout Europe, a team of experts has been working since the 1970s to perform project analysis for the dismantling of nuclear facilities (see graphic, right).

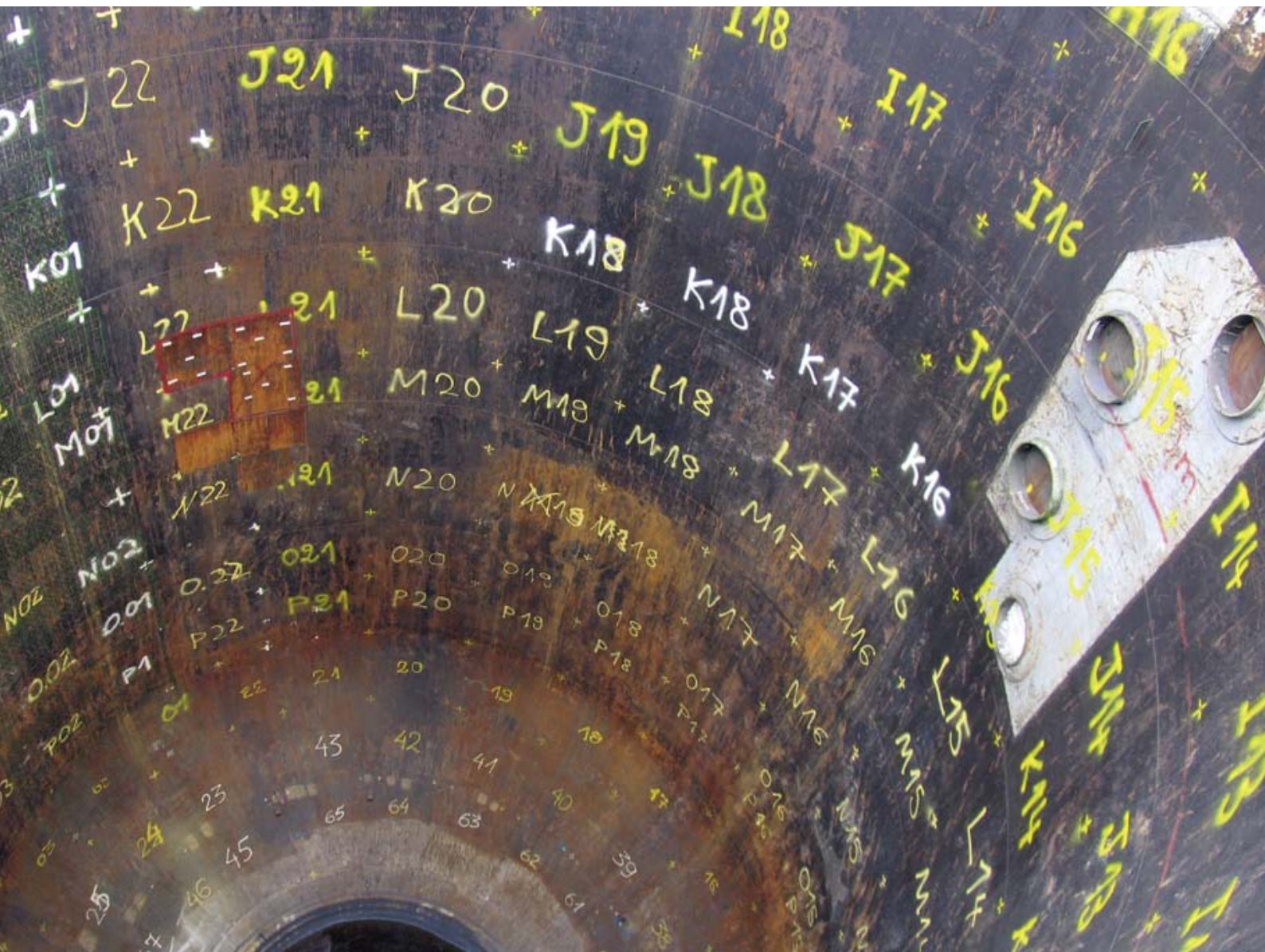
Over time, the services of Siempelkamp have expanded from pure cost calculation into all areas of the planning process for a dismantling project. "Cost calculation" now involves all scheduling, process and resource planning, calculation of the mass of radioactive waste, stipulation of optimum final depository packaging, and the presentation of the distribution of costs, mass and personnel.

A dismantling project can take up to 20 years from the shutdown to the "green field", and may have human resources requirements of up to 400 personnel at the plant site: a complex task. "In principle, this is more of a project analysis than a cost calculation," explains Dr. Aldo Weber, Business Unit Manager responsible for Process Data Processing and Consulting.

## Dismantling planning and cost calculations by NIS







Data base systems and project analysis with a wide-angle effect

The analysis of a dismantling project requires and generates large volumes of data, which it would be impossible to process without modern information technology systems. To this end, Siempelkamp has developed the Cora & Calcom database systems, as important tools that are specifically tailored to the dismantling process.

Not just the data, but also the boundary conditions set new requirements. After Germany had decided to phase out the use of nuclear energy, an important new task was added to planning and cost calculation for dismantling: the monitoring and inspection of actual dismantling projects. Modern project analysis must therefore record and visualize the structures prescribed by the operator, take account of local regulations and boundary conditions, record and compares target and actual values, and deliver information as a decision-making aid through the assessment of variants.

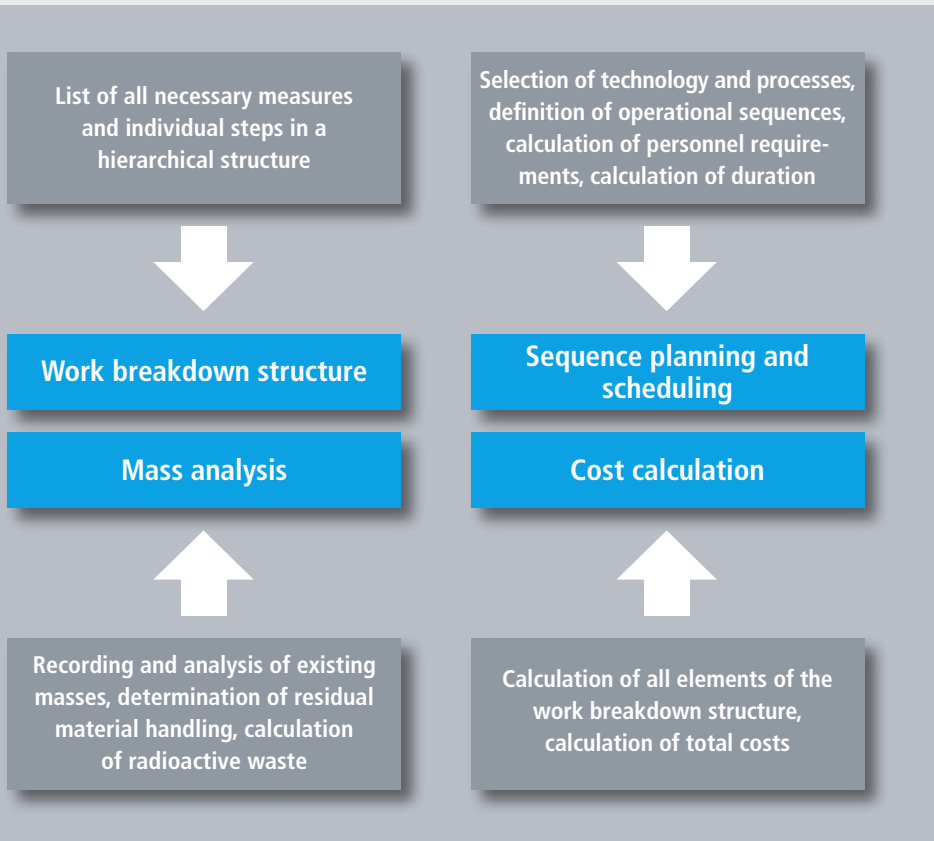


... and it is then taken apart through precision work

The entire data collected and analyzed during a project analysis is so comprehensive in modern calculations, that it is logical to also use this information for a targeted technical controlling process.

#### Four steps, one method

The NIS method for analyzing a dismantling project and its costs therefore now consists of four process stages (see graphic). These are utilized in every cost calculation, adapted to the specific conditions of a nuclear facility.



The project analysis generally incorporates the entire dismantling project. The start is marked by planning and approval processes, or the actual status if the dismantling process has already begun. The target is a defined state, e.g. the "green field".

During the calculation of a dismantling project or the consideration of variants, always all cost elements are included, and added up to deliver the total costs. The influence of individual details on the overall project can thus be visualized.

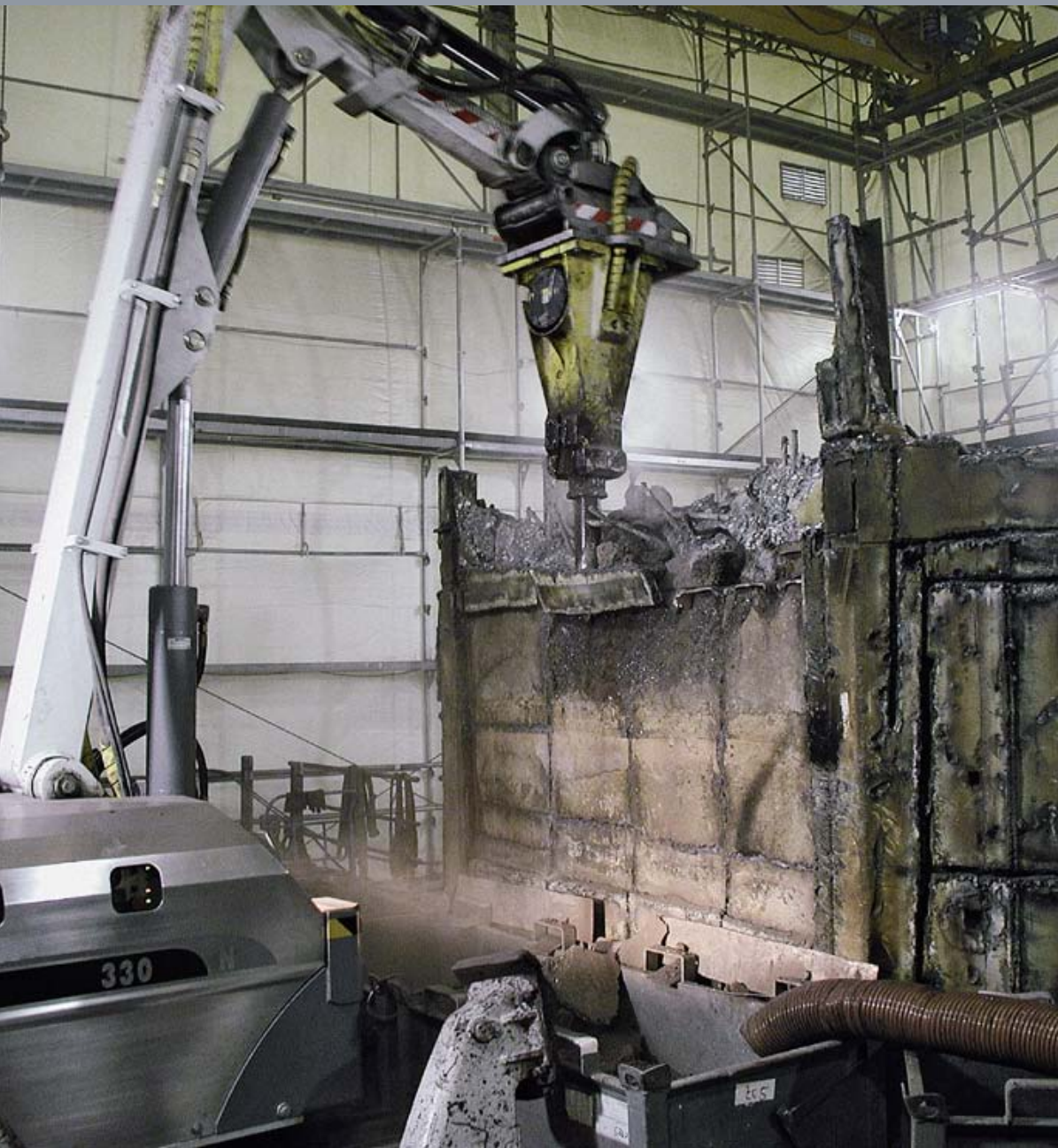
The cost calculation utilizes special calculation models, which are predominantly designed to allow the calculations to be performed with an acceptable degree of work input. This generates a large volume of specific information, facilitating comparisons between different dismantling projects, and thus allowing a simple plausibility check.

**Cost calculation: specifically tailored to the operator**

Dismantling projects that are already underway have very special requirements for the cost calculation. Each operator thus individually defines his own project. What type of decommissioning is being performed, and what kind of approval is required? How great is the scope of the system decontamination, and what degree of residual material treatment is being used? How is the onsite interim storage facility designed, and what is the target state?



The bearing ring of a reactor is carefully raised



The demolition of the components of a nuclear power plant appears crude, but must be precisely planned from the start

The answers to these questions affect the structure of the cost calculation, its level of detail, the number of cost types identified, and the presentation of results. Every cost calculation involves a high degree of individualization in how the different measures are structured and organized in the overall concept, the work breakdown structure.

The project analysis of a nuclear plant already undergoing dismantling therefore necessitates close cooperation with the operator. The project and cost structure of the cost calculation must be adapted to the structure of the actual implementation process, on both a technical and a commercial level. Only then can the cost calculation build on the current actual state of the

## Thermal cutting during the dismantling of nuclear plants



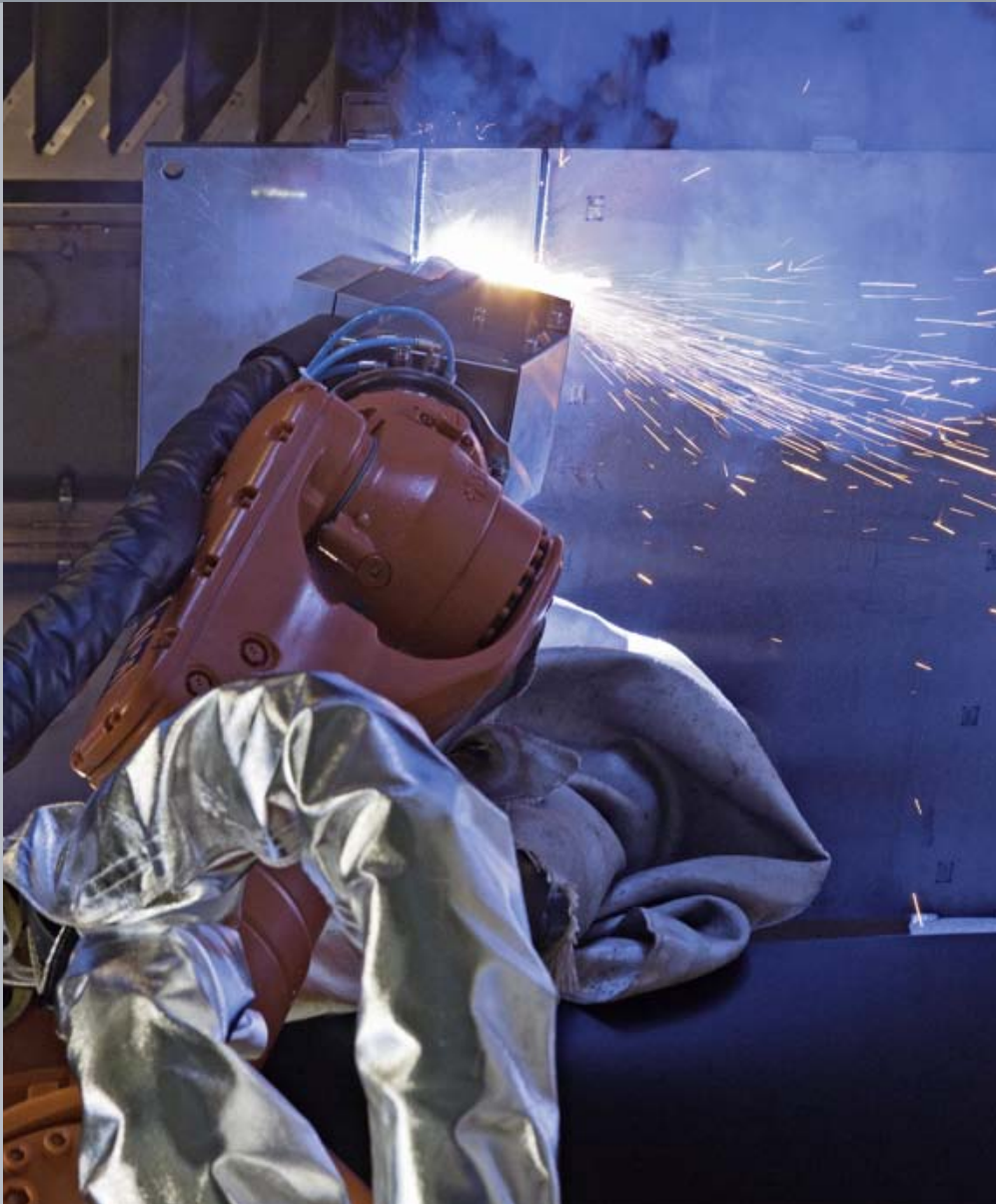
project and deliver accurate planning figures for the future, representing project and cost alterations in a clear and comprehensible manner, and documenting arguments for potential additional costs.

#### Internal and/or external personnel? The team question

The question of how much to use permanent personnel on the one hand, and how much to use specialized service providers on the other hand, is a central factor in project analysis. This requires the entire personnel strategy of the operator to be taken into consideration.

What needs to be determined is whether the trades for which an “in-house or third party” decision is to be made involve the allocation of complete contract packages, or whether comparatively small orders are being outsourced to temporary employees. Are the available plant site personnel a “competitive” alternative to third-party personnel, or should they be entrusted with the management and leadership of any third parties? How are interfaces organized between plant site personnel and service providers, or between the plant management, the dismantling team, and the treatment of residual material?

The project analysis process provides answers to these important questions. Trades in the disassembly sector are formed into cor-



central results, boundary conditions, changes, and the experience gained. This clears the way for the long-term documentation of a project.

2. In addition to the costs, each cost calculation will also display expenditures and the degree of completion of a project. This illustrates that the funds used are associated with a corresponding degree of progress. This type of representation can optionally be applied to individual projects or individual cost elements within the overall dismantling project.

The method for progress calculation is an NIS development, which is particularly designed for the specific requirements of nuclear plants. The advantage of this is that effects such as pending approvals, the postponement of individual measures, or changes in the project sequence cannot reduce the progress already achieved.

#### Conclusion: From a technical challenge to a public affair

The dismantling of nuclear plants is no longer a (solved) technical problem, but is now more than ever in the focus of politicians and the public. Because the dismantling of nuclear facilities can be a multibillion

euro project, a high degree of public interest has arisen. This is reinforced by the fact that the phase-out of nuclear energy in Germany means that such projects need to be handled for multiple plants simultaneously.

responding contract packages. Residual materials and radioactive waste can also be treated externally by third parties. NIS investigates the personnel organization within the plant operation of a dismantling project, identifying any requirements for external personnel.

#### New perspectives in project analysis

Due to the growing significance of project analysis, NIS has expanded its services in two important areas.

1. Each cost calculation is accompanied by a documentation report displaying the results of earlier calculations, including

“No project manager likes to be confronted with project changes and extra costs, so an appropriate project analysis, complete with cost calculation and technical controlling, is more important than ever. Siempelkamp is perfectly positioned to perform these tasks, and among others supports operators in Germany, Switzerland, the Netherlands and Belgium with the challenging tasks of dismantling, and particularly also with technical controlling,” explains Dr. Aldo Weber.

Camsan Poyraz:

# Capacity increase with a Büttner energy plant

In November 2011 Camsan Poyraz ordered an energy plant from the Siempelkamp subsidiary Büttner. The well-known Turkish MDF manufacturer started operating this plant in the first quarter of 2013. The Büttner energy system replaces five individual thermal oil boilers and features increasing production capacity and reduced operating costs.

By Andreas Klug

The Turkish wood-based panel board manufacturer, which celebrated its 30-year company anniversary in 2014, operates two MDF lines in Ordu on the Black Sea coast. The new Büttner energy plant replaces the company's five thermal oil boilers which were used to supply energy to both lines. "This new energy system opens up the advantage of lowering the operating costs and increasing the production capacity for our customer," says

Belkhair El Koraini, director of process technologies at Büttner.

At Camsan Poyraz the Büttner energy plant supplies the complete thermal energy required for the board production process of both MDF lines. Thermal oil is supplied to both MDF presses and three short-cycle presses as well as the steam generator which, at the same time, provides two refiners with saturated steam. Additionally, the two fiber dryers of the two MDF lines are supplied with flue gases.

Before the installation of the new energy system, the dryers were indirectly heated with thermal oil. At the same time Camsan was able to heat the dryers by means of gas burners. As part of the new installation, the gas burners were removed and the connection for flue gases from the new energy plant was installed.

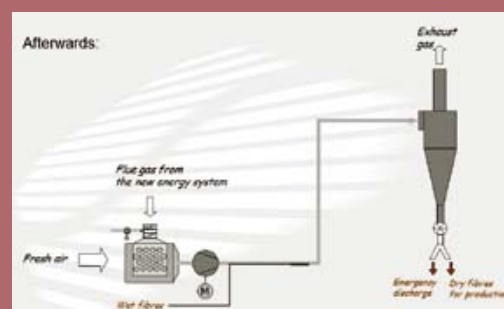
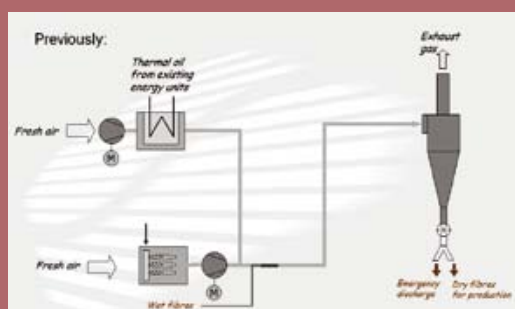
**To lower operating costs "in a direct manner"**

Converting the heating of the two MDF dryers at Ordu from indirect heating to

direct heating resulted in lower operational costs.

For the most part, the flue gases of the five old boilers were unused, they only heated the thermal oil for both MDF dryers. With Büttner's new energy plant concept, this indirect heating process is now a thing of the past. The hot flue gas is now directly supplied where it is needed without loss. This results in efficiency and increases production outputs.

The second advantage with a positive effect on operating costs is described next: The five old boilers could only be heated with wood chips to prevent a contamination of the heating surfaces. The new biomass combustion system, however, is designed for a multiple of fuels. On a moving grate with an area of 28 m<sup>2</sup>, bark, screening material, fibers, rejected panels from production, and externally supplied wood waste is burned. The wood chips saved by this system can now be used for MDF production.





42 MW energy plant



2.4 MW dust burner

**The concept in detail**

How is the new energy plant designed in detail? For the combustion of trimming material and granulates from sawing, two injection nozzles are located above the combustion grate at the sides. The upper area of the combustion chamber also contains two dust burners for the burning of saw dust from the production process.

**For the first time: one energy system for two dryers!**

The supply of two MDF dryers by means of one energy system is an innovation which Büttner successfully implemented for the first time with the system for Camsan Poyraz. Both dryers were equipped with a mixing chamber each. Here the flue gases are cooled with fresh air. An induced draft fan provides the two mixing chambers with the required amount of flue gases. The supply of flue gases is automatically controlled by the automation system depending on the dryer capacity.

**A reliable partnership**

After a successful startup of its first energy plant with the team from Hanover (former Metso) in 2004, it made sense for the Turkish Camsan company to also implement this recent project with the proven partner from Germany. That was why Camsan contacted Büttner in 2011 and a new, very sophisticated concept was developed. In 2014 both partners celebrated the highly satisfying acceptance of the plant.

Meanwhile Camsan is working on plans for further upgrading its plant – and once again Büttner is present as a reliable partner.



Moving grate

**Energy plant for Camsan Poyraz: technical key data**

Thermal oil:	22.0 MW (of it 15.6 MW = 20 t/h saturated steam)
Flue gases:	20.5 MW
Total combustion capacity:	42.5 MW
Grate furnace capacity:	22.8 MW
Dust burner capacity:	15.6 MW
Pellet capacity:	6.0 MW



# Siempelkamp

G. Siempelkamp GmbH & Co. KG

## Machinery and Plants

  
**Siempelkamp**  
 Maschinen- und Anlagenbau  
 Siempelkamp Maschinen- und Anlagenbau GmbH

  
**Siempelkamp**  
 Maschinenfabrik  
 Siempelkamp Maschinenfabrik GmbH

  
**Siempelkamp**  
 Logistics & Service  
 Siempelkamp Logistics & Service GmbH

  
**Siempelkamp**  
 Siempelkamp (Wuxi) Machinery Manufacturing Co. Ltd., China

  
**Siempelkamp**  
 Siempelkamp CZ s. r. o.

  
**3GP**  
 ATR Industrie-Elektronik GmbH

  
**BÜTTNER**  
 Büttner Energie- und Trocknungstechnik GmbH

  
**CMC TEXPAN**  
 CMC S.r.l.

  
**hombak**  
 Maschinen- und Anlagenbau GmbH  
 Hombak Maschinen- und Anlagenbau GmbH

  
**Sicoplan**  
 Engineering  
 Sicoplan N.V.

  
**VENTAPP**  
 Ventilatoren – Apparatebau

  
**STROTHMANN**  
 Machines & Handling  
 Strothmann Machines & Handling GmbH

## Sales companies/Representatives

**Australia**  
 Siempelkamp Pty Ltd.

**Brazil**  
 Siempelkamp do Brasil Ltda.

**China**  
 Siempelkamp (Wuxi) Machinery Manufacturing Ltd., Beijing

**France**  
 Siempelkamp France Sarl

**India**  
 Siempelkamp India Pvt. Ltd.

**Russia**  
 Siempelkamp Moscow

**Belarus**  
 Siempelkamp BEL

**Singapore**  
 Siempelkamp Pte Ltd.

**Spain**  
 Siempelkamp Barcelona

**Turkey**  
 Siempelkamp Istanbul

**USA**  
 Siempelkamp L.P.

## Nuclear Technology

  
**Siempelkamp**  
 Nukleartechnik  
 Siempelkamp Nukleartechnik GmbH

  
**Siempelkamp**  
 NIS Ingenieurgesellschaft mbH  
 Siempelkamp NIS Ingenieurgesellschaft mbH

  
**Siempelkamp**  
 Tensioning Systems  
 Siempelkamp Tensioning Systems GmbH

  
**Siempelkamp**  
 Krantechnik  
 Siempelkamp Krantechnik GmbH

  
**Siempelkamp**  
 Prüf- und Gutachter-Gesellschaft  
 Siempelkamp Prüf- und Gutachter-Gesellschaft mbH

  
**Siempelkamp**  
 Nucléaire France  
 Siempelkamp Nucléaire France S.A.S.

  
**Siempelkamp**  
 MSDG  
 Siempelkamp MSDG S.A.S.

  
**Siempelkamp**  
 Nuclear Technology UK  
 Siempelkamp Nuclear Technology UK LTD.

  
**Siempelkamp**  
 Nuclear Technology US  
 Siempelkamp Nuclear Technology Inc.

  
**Siempelkamp**  
 Nuclear Services  
 Siempelkamp Nuclear Services Inc.

## Foundry

  
**Siempelkamp**  
 Giesserei  
 Siempelkamp Giesserei GmbH

  
**Siempelkamp**  
 Giesserei Service  
 Siempelkamp Giesserei Service GmbH

G. Siempelkamp GmbH & Co. KG  
 Siempelkampstrasse 75 47803 Krefeld Germany  
 Phone: 02151/92-30 Fax: 02151/92-5604  
 www.siempelkamp.com