Siempelkamp

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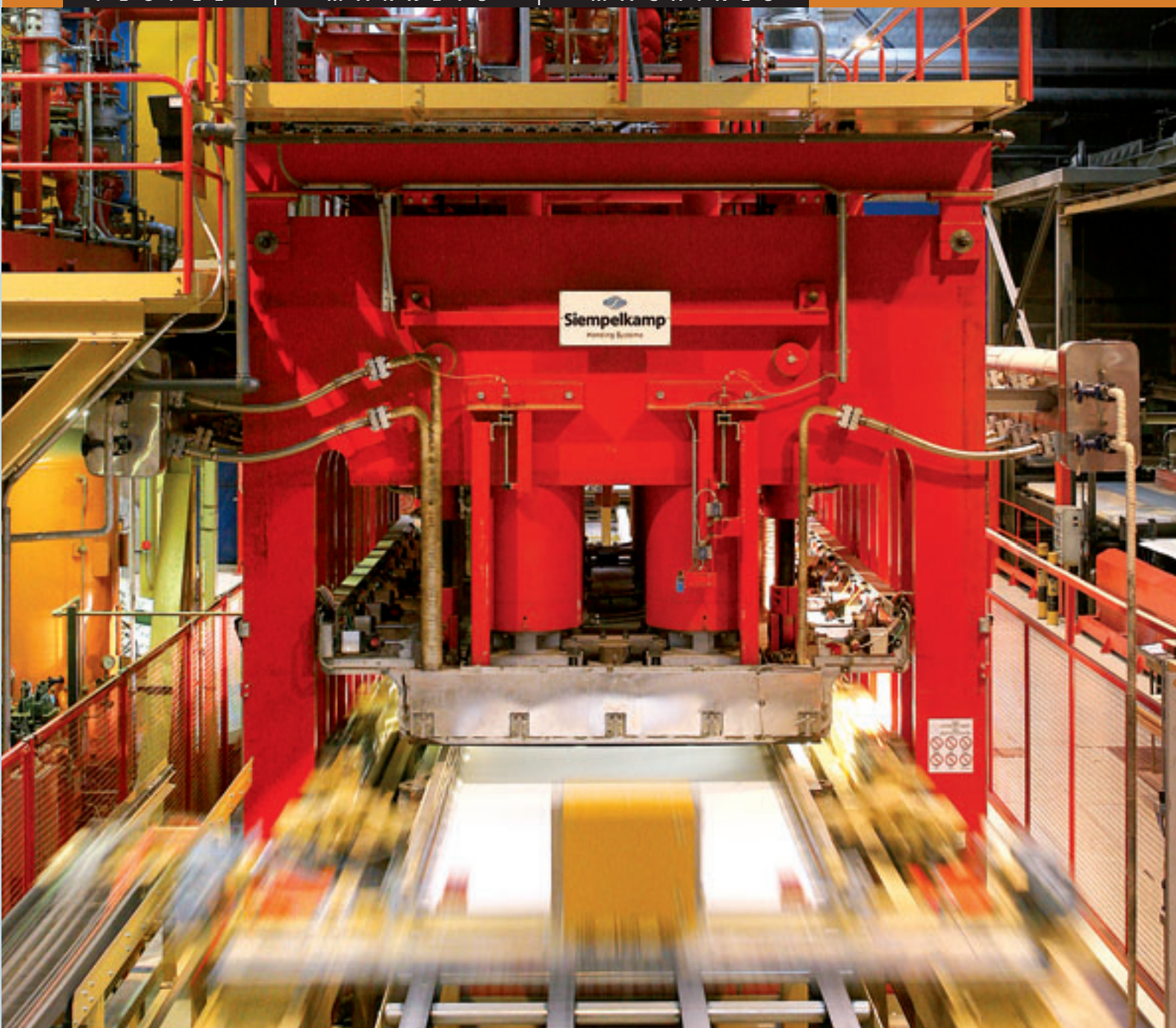
A trip to Brazil: Siempelkamp visiting Duratex and Fibraplac **NIS PAR:** A 'guard' for increased safety **For cutting-edge wind energy technology:** The RoundTrack® floor rail system by Strothmann transports blades for Vestas wind turbines **Kick-off ceremony for Dillinger Hütte:** First plate processed on straightening press

bulletin

The Siempelkamp Magazine

PEOPLE | MARKETS | MACHINES



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Dear Readers:

The first Bulletin of 2010 is the first Bulletin following the year that has kept the global economy in a state of suspense longer than any other. It has also kept us in a state of suspense, and maybe you as well.

How do we rate our business performance from 2009?

For Siempelkamp 2009 was ultimately a successful year. We recorded the second best result in the history of our company. Except for a limited time in a part of our foundry, we did not reduce working hours and did not have to let any member of our permanent staff go. This, on its own, is a nice achievement considering the economic downslide that is behind us. For Siempelkamp Maschinen- und Anlagenbau the prospects for 2010 are good. Thanks to your trust in our competence, we are already booked to full capacity into 2011.

Whether a permanent and sustained upward business trend is realistic, is still open. We are relying and trusting in the consistency of our efforts and business relationships. In this respect, this Bulletin has a clear message. In Brazil we are so familiar with our customers and their needs that even crisis years leave no negative marks.

Due to our years of experience with titanium material, we received an order from Kazakhstan. From products for the wood-based products industry to nuclear power plant inspections, the principle 'all from one source' is no empty phrase for us. This principle contributes to our reputation and results in a corresponding demand in the market. Another success factor: We will continue to advance our trainees and employees and believe in location development.

Let us have faith that the future years will become good business years for all of us.

With kind regards and best wishes from Krefeld,

Dr.-Ing. Hans W. Fechner

Agudos plant by night

Siempelkamp visiting Duratex, the owner of a record-holding ContiRoll®

In May 2007 Duratex ordered from Siempelkamp a record-size 9' x 77 m ContiRoll® press for MDF. Duratex, the largest South American wood-based products manufacturer, started operating the press at its Agudos location, approximately 330 km from São Paulo, in the middle of 2009. Siempelkamp's 200th ContiRoll® is the world's longest continuous press. It produces 800,000 m³ of MDF per year. In March 2010 Siempelkamp visited Duratex, a customer of many years, to see the reference product at work.

By Ralf Griesche

Next to the forming and press line, a flash tube dryer by the Siempelkamp subsidiary Büttner was part of the scope of supply. This fiber dryer is the largest one we have ever built. It was designed for a material throughput of 97 t/h bone dry. The cooling and stacking line as well as the complete finishing line including an intermediate storage system, sanding, cut-to-size and packing lines were supplied by Siempelkamp Handling Systeme. Boards with a thickness ranging from 2.5 mm to 37.5 mm and a maximum size of 2,850 x 5,600 mm can be produced. The press operates with speeds of up to 1,500 mm/second and achieves a daily capacity of 2,400 m³ of panels based on 15 mm board thickness.

A short-cycle press was also part of the supply. This press is suited for all applications with its inline crosswise paper laying system and embossed in-register process. Even very thin boards can be laminated.

After almost 60 years of business relations between Duratex and Siempelkamp, this project remains an extremely pleasant milestone even one year after the start-up of the press.

Duratex S.A. Brazil: data and facts

Creation of the original company:	1953
Product during starting times:	hardboard produced with a wet process
Current portfolio:	MDP and MDF, both as raw boards and laminated boards, flooring
Locations:	Agudos SP, Itapetininga SP, Botocatu SP, Uberaba MG, Taquari RS
Current owner:	family-owned by the Villa, Setubal and Seibel families
Shares:	57% family-owned, 43% publicly traded
General Manager Duratex:	Henri Penchas
Executive Industry Director:	Mario Colombelli Filho
Executive Industry Director Agudos Factory:	Paulo Marostica

Short-cycle press for the lamination of panels

From left to right: Paulo Cesar Marostica, Francisco de Assis Guimarães, Renato Aquira Coelho, Bernd Hauers, Carlos Gama Neto

Francisco de Assis Guimarães and Mario Colombelli Filho

Renato Aquira Coelho

The 77 m long ContiRoll®

"Whoever stops growing, starts dying!"

Interview with Mario Colombelli, Duratex

What objectives does Duratex hope to achieve with the 77 m ContiRoll®? How do these objectives fit in the overall strategy of the company? Bulletin talked to Mario Colombelli, Industrial Director Wood Division of Duratex, at the Agudos location, Brazil.


Mario Colombelli, Industrial Director Wood Division of Duratex

What advantages convinced you to buy the Siempelkamp press line?

The determining factor was the low fixed costs for the production due to the large-sized boards we could produce. Another decisive factor was the low development costs per square meter of produced board during the implementation of the project. We had confidence in Siempelkamp to take on such a technical challenge. Furthermore, we were influenced by the good relations we have had with Siempelkamp for many years. Back in 1952 we ordered our first hardboard production line from our Krefeld-based partner. Agudos II is the fourth new line with ContiRoll® technology. All this time, our relations with Siempelkamp have always been excellent, the quality of the machines first-class and the reliability of the machinery during operation extraordinary!

What made you decide to build a press line in Agudos?

Our Agudos location was built close to the market. Customers of the furniture industry are near by and the raw material requirements were favorable. Eucalyptus, our raw material from the surrounding area, is grown in an average radius of 60 km from our location. Duratex owns a total of 220,000 ha (543,632 acre) of land. Eucalyptus and pine woods are grown on 106,000 ha. This means we are a manufacturer that uses a share of almost 100% of wood grown on plantations and, therefore, can count on stable and low prices in the long run. We can ignore the prices influenced by the market.

Who was responsible for the installation of the line at Duratex?

Three people took responsibility for the project: Claudio Manzione and Paulo Marostica were responsible for the multi-story construction and machine installations, Claudio Rossetto for the infrastructure and he was the counterpart for the suppliers. I was the project director.

from top to bottom:
ContiRoll® press
Control room
Forming line
Wood yard

What capacity does the new line provide and what overall combined capacity does Duratex achieve with it?

Currently, we are up to 90% capacity at Agudos. The new ContiRoll® provides a yearly capacity of 750,000 m³ of MDF. As a result the overall combined capacity of our Group amounts to 3,910,000 m³ of MDF, particleboard and hardboard per year.

How is the world's largest press 'running'?

Despite its uncommon length of 77 m (253 ft), the press runs very stable. Even at high speeds and high loads it hardly ever experiences any problems. The board quality at this high output is also impressive.

What does the value-added chain look like?

We strive to maintain the added value inside the company. We supply our own wood and own glue making facilities. For the surface-finishing of our boards, we operate laminating lines (some of them made by Siempelkamp) at several locations, paper making machines, and a production line for flooring. Furthermore, Duratex owns impregnation systems and a factory for pre-fabricated furniture parts.

What markets and export potentials will open up for you with the new line?

We are supplying 95% of our production to the domestic furniture industry. The remaining 5% go into exports. This includes the European market which we manage in close distance to the local customers from our office in Genck, Belgium.

How did your markets develop in 2009 and what expectations do you have for 2010 and beyond?

In the crisis year 2009, our market shrunk by 10%. In 2010 we are anticipated to grow again by 15%. During the first few months of this year, the market development has been very promising.

Do you expect the MDF market to continue to develop positively in the coming years?

Yes, definitely. This can be attributed to Brazil's demographic development. Because of the good overall economic growth, the middle class is increasing in size. This means they have more money to spend. That money is spent on expanding their housing space and on furniture which are both areas that our business is based on.

What future do you predict for the OSB market?

In my opinion, this product will have no future in Brazil, at least not as long as plywood is so plentiful and available at a low cost.

What objectives does Duratex have for the future?

We will continue to invest in new equipment according to the motto: "Whoever stops growing, starts dying."

Stacking system

The man who lives in the future

For 26 years Siempelkamp has had one contact at Duratex responsible for the project planning of new equipment. His name is Carlos Nogueira da Gama Neto. During our visit in Brazil, we had a chance to meet with him again.

Fiber dryer

top: Book saw for book heights of up to 260 mm

right: Carlos Gama Neto

As the project developer at Duratex, Carlos Nogueira da Gama Neto is responsible for the planning and engineering, the installation of the equipment, the start-up, and the environmental protection. At Siempelkamp we regard him as a friend because his expertise combined with fairness and stoic calmness has braved many storms.

Siempelkamp constructed the very first MDF line in Brazil together with him at Duratex in Agudos. This line incorporated a ContiRoll® press with a length of 26.5 m (87 ft) which started operation in 1997. Then, in 1999, a particleboard plant including a 35.4 m (116 ft) ContiRoll® was built at the Itapetininga location. A second MDF line was built in Botucatu in 2002 and accepted by the customer in 2003. The ContiRoll® press of this line already had a length of 50.1 m (164 ft).

The world's longest press has truly been a milestone: The contract for the delivery of the equipment was signed by both partners at the Siempelkamp booth on the occasion of the LIGNA fair in May 2007. Carlos Gama was also present. At that time he had already worked several years on this project with a team of ten people. Most of the questions regarding the project were already answered and the suppliers could start right away with the development and delivery of the machinery.

This line was a wish coming true for Carlos Gama. His goal has always been to have state-of-the-art equipment for his lines! This time he received a world innovation. Never before had such a large press been built and started up.

All movable parts such as chains, roller rods and steel belts had to be partly newly developed in order to withstand the large forces of this press. This work involved a lot of effort by Carlos Gama and Siempelkamp. The work was crowned by the successful start-up of the equipment.

With 800,000 m³ of MDF per year, this press produces almost four times as much as the first press that Carlos Gama built together with Siempelkamp in Agudos in 1997.

Carlos Gama is 60 years old and married. He has a university degree in mechanical engineering and has been working at Duratex since 1984.

Duratex and Satipel: success in business

In June 2009 Duratex S.A. merged with Satipel Industrial S.A. The new business continued to operate under the name of Duratex S.A. The merger resulted in a company that is now the largest wood-based manufacturer in South America. Its impact on the market is immense.

The new Duratex S.A. supplies a yearly capacity of approximately 4 million m³ of MDF, particleboard and hardboard to the market. Furthermore, Duratex and Satipel laminate several million square meters of board per year. Duratex also manufactures up to 6,000,000 m² of laminate flooring per year. The company's forest stand of 220,000 ha provides unlimited raw material supply.

Regarding the company's capacity worldwide, Duratex S.A. takes eighth place among the world's largest wooden panel producers. For the two combined companies, the merger had numerous advantages including:

- gain in size
- complementing one another's market operations
- geographical diversification
- concentration of the best resources of economical, administrative and personnel nature
- engagement of talented personnel
- expansion of research and development

For Siempelkamp the merger marks the union of two companies that have been business partners of Siempelkamp for many years. That is why we decided to visit not only the Duratex location Agudos, but also Taquari, the former Satipel location in South Brazil. This site is also home to Siempelkamp products. The latest example is a new particleboard plant with a 9' x 38.7 m ContiRoll® which Satipel ordered in November 2007. This line started operating in 2009. Other Siempelkamp services around the press included the planning, engineering, and start-up by our Belgium subsidiary Sicoplan. Büttner supplied the dryer, Siempelkamp Handling Systeme (SHS) the cooling and stacking line, storage system, sanding, cut-to-size, and packing lines. With this press Duratex S.A. manufactures particleboard with a thickness ranging from 6.4 to 40.7 mm and with a maximum size of 5,660 mm x 2,840 mm. The raw material for the particleboard production is eucalyptus and pine. This material consists of 70% green wood and 30% saw wood residues. The press operates at speeds of up to 1,200 m/second; a board density of up to 755 kg/m³ is achieved. Currently, the press achieves a capacity of 1,200 m³ for boards with a mechanical thickness of up to 15 mm. A second dryer could double the capacity. 95% of the product is used in the

Forming and press line with ContiRoll®

Diagonal saw at press outfeed area

Stacking system

Star cooler

Book saw

Dryer

furniture industry; the remaining 5% is used in the timber trade.

A short cycle press and a finish foil line for the surface-finishing of the boards can also be found at the location. The plant in Taquari also operates an impregnation line and a line for the production of furniture components and post-forming parts. The MDF market has developed positively in the last months; the price for particleboard is still 7% lower than in 2008.

Our trip to Brazil gave us the pleasant opportunity to see two of our customers under one consolidated roof and demonstrated how Siempelkamp services contributed to a positive development of business operations!

Third stop in Brazil: Fibraplac

Once in Brazil, we travelled from the Duratex locations in Agudos and Taquari to Glorinha, a city in the State of Rio Grande do Sul, east of Porto Alegre. Here, Fibraplac manufactures particleboard on a new 9' x 33.8 m ContiRoll® press-line.

In July 2007 Fibraplac signed a contract with Siempelkamp for the supply of a particleboard line. In addition to the forming and press line, other Siempelkamp services included in the contract were the planning, engineering, and start-up provided by Sicoplan. Büttner supplied the dryer and SHS a cooling and stacking line, storage system, a sanding line with two-pass-saw and a packing line.

The raw material from eucalyptus and pine wood is pressed into particleboard with speeds of 950 mm/second. These boards have a thickness ranging from 6 to 40 mm and a size of 2,745 mm x 5,520 mm. The line has a capacity of 1,800 m³ per day for boards with a mechanical thickness of 15 mm.

Next to this new line for the production of particleboard, Fibraplac also operates two Siempelkamp MDF lines with a yearly capacity of approximately 400,000 m³. All three lines are located in the same facility. They are efficiently sharing one finishing line.

Fibraplac carries out the surface-finishing of boards on four Siempelkamp short-cycle presses. The Fibraplac machine park also includes a laminate flooring line with a monthly capacity of 140,000 m², an impregnation line and a sawmill. Next to wood-processing, the company is an established producer of fiber cement board, water tanks, and plastic pipes. Furthermore, Fibraplac is involved in completely other sectors. Hotels, shopping centers, and a building company are also parts of the Group.

With this much diversification, the company has indeed positioned itself panic-proof!

Two MDF and one particleboard line under one roof

One of two MDF lines

Press outfeed area of the new particleboard line with double diagonal saw

One of four short-cycle presses

Alexandre Dias de Araujo

Two pass saw for the new particleboard line

Three star coolers for three lines

Logistical masterstrokes achieved by coordinated effort within the Siempelkamp Group:

A casting goes on a journey

By Thomas Zachau

In 2009 Siempelkamp Foundry produced about 4,500 castings with different dimensions and weights. While Siempelkamp Foundry is well-known for record-holding finished products, a much less obvious, but nevertheless equally important service might turn out record-breaking as well: the transport of the castings from Krefeld to their destination points. Our report shows that when it comes to transport planning, it's often the little things that cause big problems.

Loading with Big Rocky at the Krefeld port

Night-time road transport

Once a casting has left the Siempelkamp Foundry by truck and is on its way to the port via the German freeway system, the order processing departments of the foundry and the involved freight forwarding company have already completed their tasks. By carrying out tasks such as the route planning, the permit procedures and the time scheduling for individual transports, Siempelkamp Foundry has added valuable services to complete its portfolio.

Basically, the same procedural steps are required before each transport. However, especially the extra large and heavy castings pose greater individual challenges for the involved planners. This report describes these difficulties with an example of a grinding table for a cement mill which was cast at Siempelkamp Foundry in 2009.

Grinding table on tour

Key data for the large casting, which had to be transported from Krefeld to the machine shop in Karlsruhe, included a raw casting weight of 142,000 kg (156.5 US tons), a diameter of 6.15 m (20.2 ft), and a height of 2.65 m (8.7 ft). A car needs around four hours to cover this distance of approx. 370 km (230 miles). Unfortunately, a grinding table and a car do not make an ideal team. The transport of our casting by truck requires a trip time of two to three days. The transport can only take place at night between 10 p.m. and 6 a.m. Furthermore, a police escort is mandatory for such transports. In the case of an unforeseen police operation, the transport comes to an involuntary stop until the operation has been completed.

Before a casting can leave the foundry, precision planning work has to be carried out. Since Siempelkamp does not operate a truck fleet, the company commissions a freight forwarding company with transports. For the transports of large components, such as our grinding table, the freight forwarder has to obtain special permits from the appropriate road traffic authorities.

The transport route is examined carefully

When applying for these permits, it is not enough to only state the destination point of the casting, but to describe the entire transport route in detail. For this, the freight forwarder determines the best route. This route is test-driven with a car in order to review the actual conditions along the road. Everything noteworthy is recorded. This includes traffic lights or road signs which narrow the road and make a passage impossible. Such obstacles would be disassembled for the duration of the transport and reassembled afterwards.

Likewise, every bridge along the route is given special attention. Is the bridge capable of supporting both the weight of the casting and the truck? If the route seems reasonable to the freight forwarder , all details of the route are put into the permit application before submitting the application to the appropriate authority.

The next step in the process is in the hands of the officials. The application is considered by the road traffic authorities. Since the jurisdiction over the road network in Germany is divided into separate precincts, a number of different authorities are involved in the approval process. Each authority has the statical calculations

Waiting for the permit to transport the casting to the machine shop

Mechanical machining of the grinding table

Casting of a grinding table

for their routes only. These calculations provide the maximum total weight allowed on the roads including the weight of the truck. For our grinding table the raw casting weight was 142,000 kg (156.5 US tons). The total weight including the weight of the truck amounted to 195,000 kg (215 US tons).

Even though, just a few months before, similar castings may have been transported on a certain route, it is not unheard of that the same roads cannot be used again for another transport. That could be because meanwhile the allowable maximum weight for a bridge may have been downgraded and due to the lack of rehabilitation, the building structure will no longer support any higher loads. Therefore, a transport on the former route is no longer allowable. In the case where a downgrading took place, the freight forwarder has the chance to commission an independent authority to recalculate the allowable weight for the bridge.

If the independent authority retrieves a result different from that of the particular precinct, the survey report is reconsidered by the precinct authority. The result of this consideration is final and cannot be protested. If the authority sticks to its decision that the bridge cannot be passed over due to the high loading weight, the submitted routing can be rejected. For the freight forwarder this means that the entire planning process including the route survey has to be carried out again and the approval process starts over.

On the road again?

Not only the requirements from the statical design of bridges can prevent a transport. Roadworks that narrow a road can also prevent transport permits from being issued. Due to an economic stimulus package passed by the German Federal Government, several construction projects are underway at the same time on different highways. This means that finding an appropriate alternate route is becoming increasingly difficult. Sometimes castings can no longer reach their destination point via the road network.

All these occurrences can lead to the denial of the transport permit and, consequently, to delivery delays. In individual cases this can result in a contract penalty for Siempelkamp. Regarding our grinding table order, a non-acceptable delay was imminent because no alternate routes could be found. Roadworks along the route made the roads impassable. Again and again the authorities issued negative notices following different proposals from the freight forwarder.

In this situation the Siempelkamp Group worked hard to demonstrate their reliability. Following the mechanical machining, carried out by Siempelkamp Maschinen- und Anlagenbau in Krefeld, and the acceptance of the casting by the customer, the transport to the Hamburg port was upcoming. Again, this required an approval process.

A small but important side effect: During the machining process the grinding table decreased in size and weight. Including the packaging the casting now "only" weighed 114,000 kg (125.6 US tons). Together with the truck the total weight amounted to 174,000 kg (191.8 US tons). The outer dimensions still amounted to 6.1 m x 6.1 m x 3.0 m (20 x 20 x 9.8 ft). However, even for this, now weight-reduced load, no solution for transporting the load exclusively on a truck could be found. The current construction site conditions on Germany's highway system posed an insurmountable obstacle.

The solution: transport via ship

How could we keep the delivery date that we agreed to in the contract? For our grinding table, a combined transport on truck

Ready-packaged for the transport, the safety eyes are installed

Loading onto the truck

and river barge was the solution – even though this solution resulted in additional re-loading and higher costs compared to road transport. As the market leader for large and heavy castings we already had one ace in the hole. By continuously exerting influence on Krefeld's infrastructure over the years, we have achieved an easily accessible transport connection to the Rhine River port in Krefeld-Uerdingen. This connection has become an important competitive advantage for us.

On its way – thanks to 'Big Rocky'!

The result: Against great odds, we were able to deliver the grinding table on time. Our trained employees at the Siempelkamp Foundry secured the casting on the truck according to regulations. After the Krefeld police department examined all papers and inspected the truck in detail, the casting departed from the Siempelkamp premises around 10 p.m. The next morning the casting was lifted by 'BIG ROCKY', a 200 t (220 US tons) crane at the port, from the truck and placed with millimeter precision onto a river barge.

While the grinding table was on its way to Hamburg, the employees of the order processing department at Siempelkamp Foundry had already resumed their fights against Germany's construction site conditions on German highways and applied for permits for several other transports.

This example demonstrates that not only our casting production but also our logistics run at full speed to complete an order. Immense expenditures are necessary and take place in the background during the production process. This example also shows strength and flexibility on the part of the Siempelkamp Foundry which stands by its customers with reliability and adherence to delivery dates.

The grinding table is securely clamped

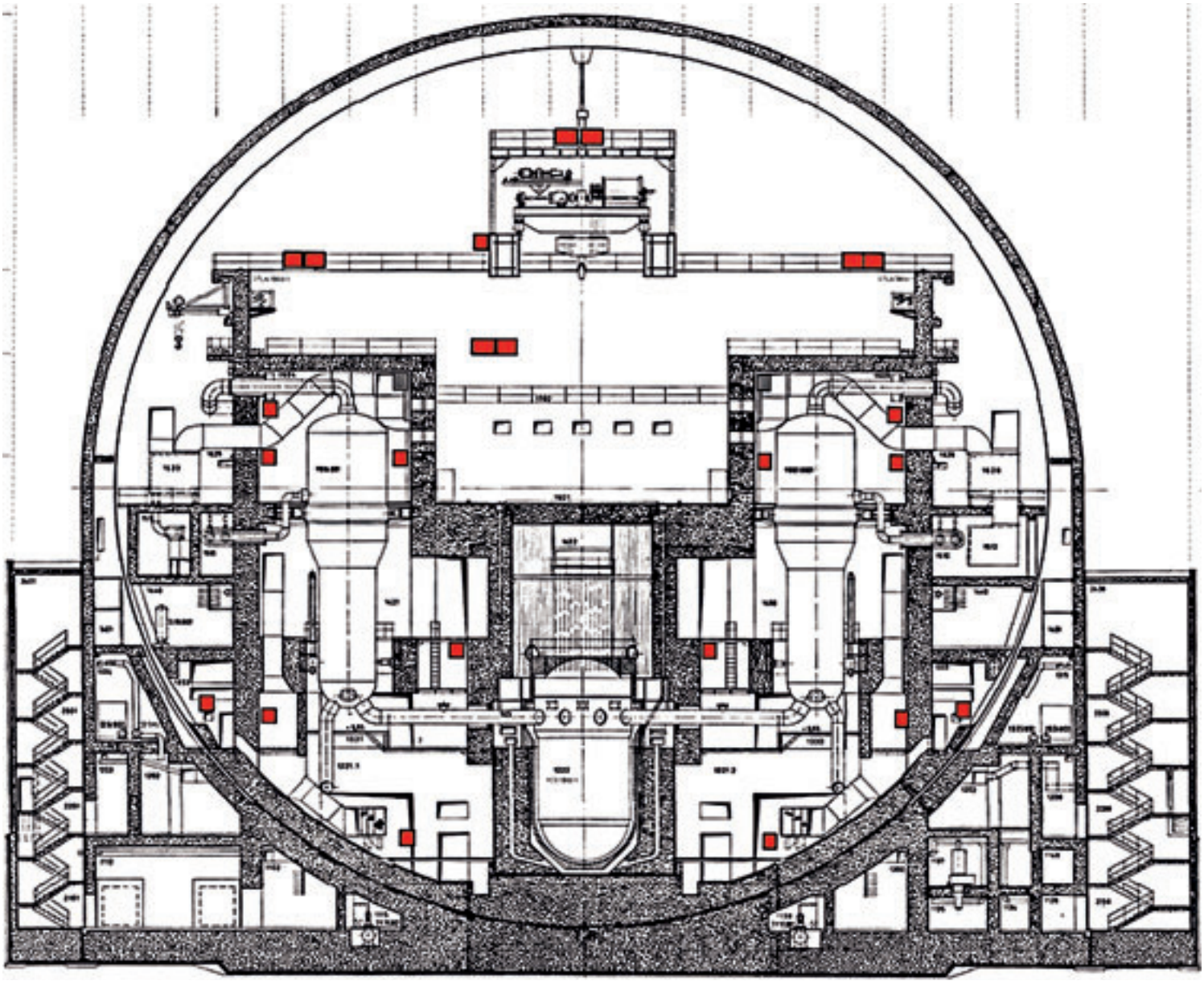
Securely clamped, the casting is ready for the night-time transport

The fourth of five RWE nuclear power plants received an NIS hydrogen recom

NIS PAR – a ‘guard‘ for increased safety

By Manfred Seidler and Markus Thoma

Installation locations of NIS PAR (red) in the containment of a pressurized water reactor



bining system:

In December 2009 NIS Ingenieurgesellschaft mbH equipped unit A of the nuclear power plant in Biblis, Germany, with a hydrogen recombining system. The concept itself was launched in 1989. Back then, NIS Ingenieurgesellschaft mbH (NIS for short) received the order for the development of a simple device with a big impact. The result is called "NIS PAR" – a stainless steel housing with palladium internals which reduces hydrogen by means of a catalysis. The process works similarly to that of a catalytic converter which reduces the pollutants of a car.

The concept should be able to remove from the containment of a nuclear power plant small to large quantities of hydrogen out of the explosive hydrogen-oxygen mixture that develops when hydrogen mixes with the oxygen in the ambient air. This guarantees the safety in the nuclear power plant in the rare case an accident should happen. The NIS development PAR – Passive Autokatalytic Recombiner – is at the end of a long chain of developments which are aimed at the reduction of hydrogen concentrations. Some of the formerly developed devices would have to be turned on or have a constant power supply in order to work. Spark plugs or glow plugs as known from gas and diesel engines should ignite and burn the hydrogen at an early stage before large amounts could accumulate.

Other systems achieved this effect with a flame inside an apparatus which was integrated into the air ducts.

This type of hydrogen removal did not satisfy the specialists. In order to protect the containment, hydrogen explosions should be prevented and not triggered by spark ignition. None of the above solutions was fully convincing. That is why, in 1989, RWE decided to commission NIS with the development of an appropriate device.

The NIS PAR concept: handy, compact, effective, stand-alone

During a hypothetical disaster scenario, more than 1000 kg of hydrogen could theoretically be formed and released. The objective of the NIS development was a device that is easy to handle and compact at the same time so that it can be installed anywhere in the containment. The device would have to be guaranteed to operate under all possible atmospheric accident conditions, for example steam and high temperatures, and without external assistance.

Palladium-coated catalyst material

Different locations of use (from top to bottom): on the steam generator, in the controls and instruments room, inside pipe channels

The first attempts concentrated on finding a suitable catalyst material which would react sensitively to hydrogen concentrations in the ambient atmosphere, which is in the presence of steam or moisture. The first tests were carried out with self-made testing equipment. It was exciting for everyone involved to feel the generated heat for the first time and to know that the concept worked. During tests with higher hydrogen concentrations a lot of heat was generated.

The performed material tests brought forth the best results when a palladium-coated pellet material was used. During later stages in the development we used this type of material and also waterproofed it so that the functioning of the material would not be hindered by absorbed moisture. Still today, a higher sensitivity is achieved in tests with the selected material compared to other material types.

Finally, an appropriate design had to be found. A stainless steel housing proved to be the optimal solution. The success of the concept is based on cassettes, containing the catalyst material, which are inserted into the housings. Inside the housing the cassettes are arranged vertically so that flow channels can develop between them. During the cold burning of hydrogen initiated by the catalyst material, heat is generated and, with it, a fireplace effect. The warm air escapes on top and fresh air is pulled in from the bottom. In this way, the heat from the reaction becomes the convection motor for the removal of the hydrogen from the ambient atmosphere.

The cassette itself has a complicated design. Several complex requirements, for example, a simple production and assembly, the ability to quickly fill it with the catalyst material, high rigidity, constant thickness as well as the existence of many slots for an

Operation of the hydrogen recombining system at a polar crane in the nuclear power plant

unobstructed air supply had to be combined in the design. After all, a pressurized water reactor had to be equipped with about 4000 cassettes. The best way to produce these cassettes is with a complex stamping tool which is able to produce a cassette half in just a few steps. First, the inner and outer cassette halves are produced. They are fitted into each other and then riveted together. The cassettes are filled with palladium-coated pellet material by means of a vibrating table.

Worldwide tests confirm: "It works!"

Tests that were carried out worldwide have confirmed that the work of NIS was successful. The functioning of NIS PAR under all tested conditions has been verified. Soiling of the devices should, however, be prevented. During inspection operations, it is therefore recommended to tightly cover up the housings in the containment or to stow away the cassettes with the palladium-coated pellets for preventive detention in boxes.

To date NIS PAR systems have been installed in Germany in the nuclear power plants Biblis, Philippsburg and Gundremmingen as well as in two nuclear power plants in the USA. There the effective hydrogen recombiners will stand lifelong guard against dangerous hydrogen concentrations in the containment.

Catalytic cassette

Installation of hydrogen recombiners at the nuclear power plant Biblis

Testing and inspection operations at the refinery "TOTAL Raffinerie Mitteldeutschland":

A planned shutdown to increase safety and reliability

By Dr. Peter Seliger

Every five years, as stipulated by the legislative body, refineries and large chemical plants are put to the test. Production comes to a standstill, cleaning and maintenance tasks are carried out, and the Technical Inspection Agency as well as other inspection agencies test machinery and equipment for safety and integrity. In May 2008, TOTAL Raffinerie Mitteldeutschland GmbH was up for such an inspection. The refinery, which is located in Leuna, Central Germany, refines approximately 10% of the crude oil needed in Germany into mineral oil products. During the inspection, Siempelkamp Prüf- und Gutachter-Gesellschaft Dresden (SPG) was solely responsible for the condition assessment and the lifetime monitoring of important components including the process facilities, reactors, containers, controls and instruments, and pipelines of a total of eight production lines.

Component metallography on a fitting

It was to be the most extensive inspection ever for TOTAL Raffinerie Mitteldeutschland. The costs for the general inspection including the necessary investments amounted to approximately 200 million Euros. The investments focused mainly on the upgrading of the distillation system and the upgrading of the POX/methanol facility with a new measuring station. The investments also included a fourth dust filter for the cracker and the integration of a new sulfur removal system. Approximately seven weeks of downtime were estimated to complete the inspection. Accordingly, all the company's reservoirs were filled to the brim in order to sustain customer deliveries. Vehicle drivers as well as fuel and mineral oil dealers in Central Germany did not have to worry about supply bottlenecks during the planned shutdown.

Without the help of the neighboring communes this large project would not have worked out. With a temporary exit ramp from the Autobahn close to the city of Großkorbetha, a direct route to the refinery was established. An additional parking lot as well as a new light signaling system also contributed to relieving traffic congestion. More than 3000 additional workers from more than 150 companies provided excellent work at the refinery during the shutdown. 1500 containers with changing rooms and showers were set up especially for these additional workers. Also, two additional bus routes and two on-premise cafeterias were established to accommodate the extra workers.

The necessary hardware was also available. More than 25,000 spare parts were readily available at the start of the project. The tasks proved to be complex. For 1500 containers pressure tests were pending and more than 500 heat exchangers had to be cleaned and inspected. 40 reactors and 14 furnaces also had to pass the inspection. Furthermore, 1500 controls and instruments had to be disassembled, inspected and reassembled.

Certified and approved

In order to qualify as a contractual partner, SPG had to acquire the Safety Certificate for Contractors (SCC). This certificate is indispensable when performing works in refineries, chemical plants and, in the future, power plants. The certification process concentrates on the development of a management system for subcontractors which focuses on health, safety, and the environment. The objective of the SCC standard is to reduce the accident rate during maintenance, repair, and inspection operations as well as to prevent work-related health impairment and environmental and material damages. In order to keep this standard up to date, the German Technical Inspection Agency reassesses the system annually.

The official tendering for the lifetime monitoring services took place in summer 2007. Following the submittal of the offer, several contract negotiations were carried out. The contract was signed in March 2008, the inspection operations could commence in May 2008.

Testing inside a boiler drum

Radiographic inspection of a pipe elbow

Surface crack testing of a welded seam

Replica testing of an elbow pipe

Replica testing of the welded seam of a flange

Concentrated forces – cooperative teamwork

A detailed time schedule challenged us to concentrate our reserves and to increase our staff for the testing and inspection operations. Next to the nine staff members of the SPG team, we brought personnel from partner companies aboard. In the end, SPG was responsible for a team of 23 people and their professional and safety-related matters. Project coordinators and operative executives had to carefully watch over upcoming inspection operations on the different production lines, evaluate test results daily with the employer, identify potentials for improving operational procedures, and answer safety-related questions. Without teamwork nothing would have worked. The good cooperation that existed between the employer and the involved subcontractors from the beginning contributed immensely in creating the foundation for a successful project handling by Siempelkamp Prüf- und Gutachter-Gesellschaft!

Our testing and inspection services included visual examinations, for example by means of video endoscopes, ultrasonic wall thickness measurements, geometry inspections, as well as testing for inter-crystalline stress cracking corrosion. Non-destructive testings such as penetrant testing, magnetic particle inspection tests, ultrasonic and radiographic inspections detect possible cracks in the surface or inside the material of pipes and welded seams. Another service we offer is the ambulant component metallography and hardness measurement of pipes, pipe elbows, fittings, and welded seams. It allows conclusions about the structural conditions and possible damages due to service conditions. The onsite findings excluded such abnormalities. The material samples removed on location also gave no reason to suspect such damages. They were examined for their chemical composition, tensile strength and impact strength as well as for their micro and macro structural conditions. The results were consistently satisfactory.

Due to the unerring implementation, all testing and inspection operations were completed according to schedule within four weeks. After only one month we were able to submit to the customer a total of 31 inspection reports.

Conclusion

Again we have implemented comprehensive programs consisting of engineering and testing services to the satisfaction of our customers. New orders and inquiries regarding lifetime monitoring services during the planned shutdowns at the Raffinerie MiRO Karlsruhe and the DOW Chemical Böhlen already exist for 2010. We are looking forward to these new tasks!

Testing and inspection operations outside the TOTAL Raffinerie

1985 – 2010: 25 years of

A pioneer in the field of emission control celebrates its anniversary: For 25 years NIS Ingenieurgesellschaft mbH has successfully developed and supplied computer systems for the continuous emission control. NIS leaves dust, sulfur dioxide and other pollutants no chance and supplies state-of-the-art technology which keeps pace with changing laws!

By Dr. Helmut Obermayer

Emission control in power plants

emission control with NIS

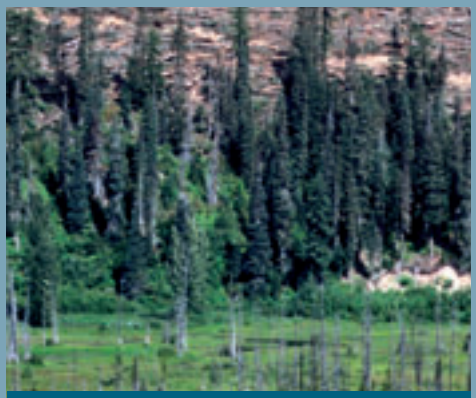
Starting at a certain size, plants are required to continuously record the release of certain pollutants into the atmosphere. The compliance with maximum permissible values has to be monitored. For example, dust, sulfur dioxide, nitrogen dioxide, hydrochloride acid, and other pollutants which are released into the atmosphere by power plants, incineration plants, and other industrial plants have to comply with these values.

Global environmental topics such as climate change, melting glaciers, Kyoto protocol, or the "Conference on the Environment" in Copenhagen currently control the media and are asking for solutions. Coal-burning power plants are demonized as climate killers. With all the improvements that are still necessary, it cannot be forgotten that in the 1970s and 80s West Germany already focused on improving the environmental situation. Keywords such as forest death, smog, and acid soil were the main topics of public discussions back then and triggered the need for action.

In regard to air pollution control, the German lawmakers set basic general regulations by passing the 13. BImSchV, TA-Luft and 17. BImSchV (see legend in right box). Since then, the regulations and guidelines have been revised multiple times and adjusted to the state-of-the-art technology. For plant operators, which have to comply with these regulations, this means that equipping or retrofitting plants with measuring technology for the continuous emission control is inevitable.

Each of these regulations triggers the need to equip new plants with emission control systems. With appropriate transitional periods, many older plants also need to take actions.

The technical requirements for these systems are set by the LAI (Federal States Committee for Emission Control), a committee of the "German Conference of Environment Ministers". This committee published evaluation guidelines for the emission control and adjusts these according to the state of the law. The last revision took place in 2005.



Forest death

NIS: recognizing market potential early on

NIS recognized early on that a market was developing for which the legislation was clearly going to define the requirements. The "Federal Control of Pollution Act," also called "Regulation on Large Combustion Plants," that became effective on July 1, 1983 had a decisive influence on this market. This regulation defines the permissible sulfur dioxide, nitrogen oxides, dust, and carbon monoxide values for coal, oil and gas-fired power and combined heat and power plants with thermal outputs above 50 MW (for gas above 100 MW). No later than June 30, 1985 these values had to be monitored with continuous emission control systems. Older plants, which were destined for decommissioning by 1993, were exceptions.

In the early 1980s measurement devices were used to detect pollutants but no computer systems existed that could process and evaluate the data accordingly. At a time when personal computers were still a dream of the future, NIS saw a new, not yet taken, business area for its competences. The experience NIS had gained in the area of nuclear technology, regarding the development and programming of micro computer systems, could be used as an optimal solution for the collection and evaluation of data in the area of emission control!

The established manufacturers and suppliers of gas analyzers, which needed their own emission evaluation system to complete their product spectrum, were potential competitors. Other competitors included large electric power companies which sought a company-wide uniform solution tailored to particular needs as well as other newcomers similar to NIS. Due to the costly system performance tests carried out by an approved expert and required by evaluation guidelines, their number was considered slim.

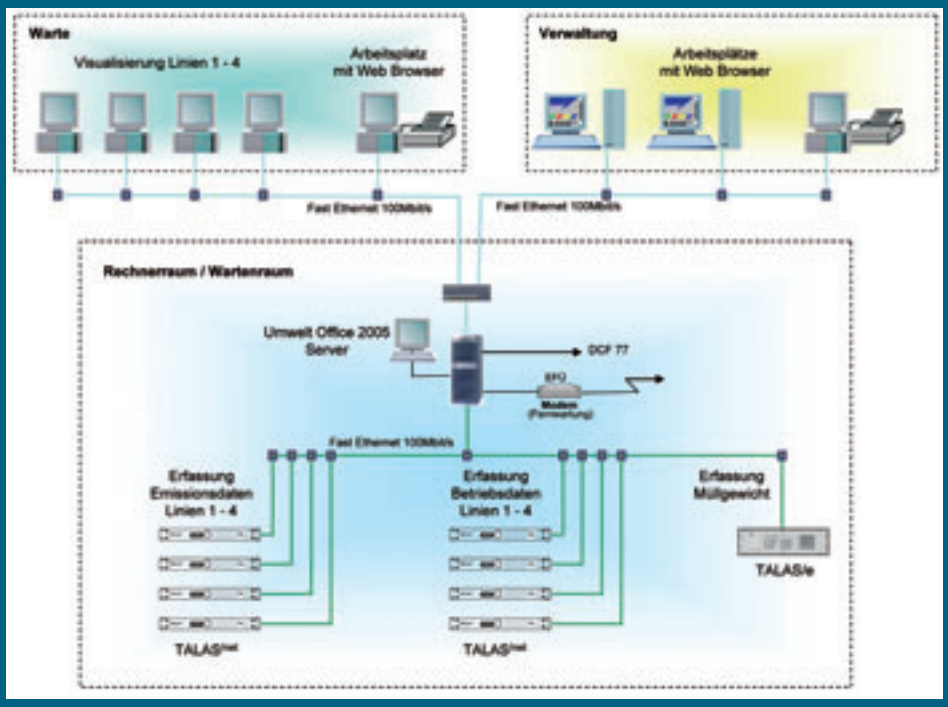
Legend:

BImSchV = BundesImmissionsSchutz-Verordnung = Federal Immission Control Ordinance

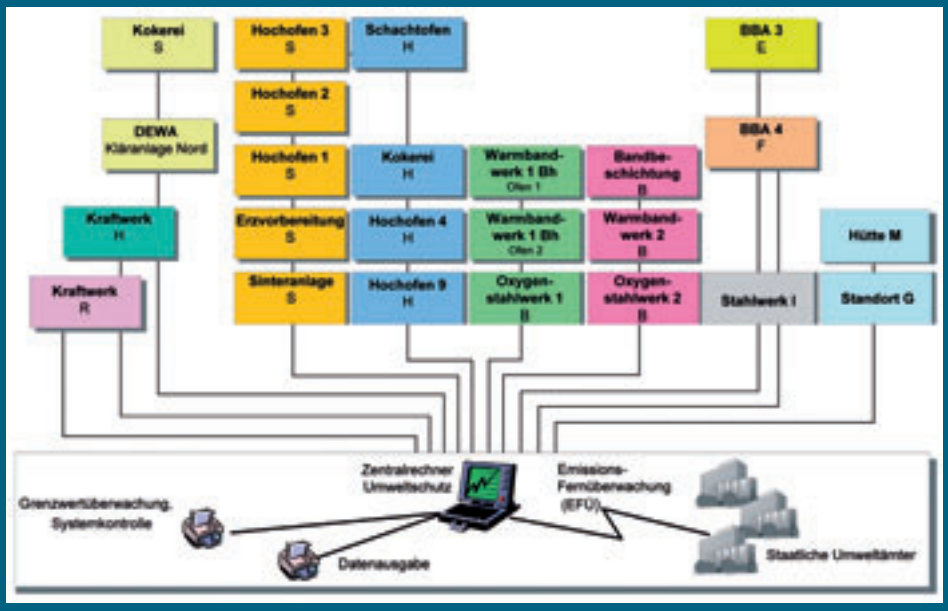
13. BImSchV = passing 1983;
as for large power plants

17. BImSchV = passing 1992;
as for waste incineration plants et al.

TA-Luft = TI-Air = passing 1987;
as for industrial plants and smaller power plants



Emission control in an incineration plant



Emission control in the steel industry

1983 – NIS starts developing the emission computer system

In 1983 NIS Ingenieurgesellschaft decided to develop and market a computer system for the continuous collection and evaluation of emissions. Prior to all other competitors, the company introduced its emission data collection system based on a micro computer in 1985. NIS was the only provider that was able to deliver emission control systems before the June 30, 1985 deadline for the retrofitting of plants with such systems was expiring. With easy-to-handle operating interfaces and reports, graphic displays with aids for the operating personnel as well as the long-term storage of emission data for official and company evaluations, the NIS system was the only concept that was acceptable. Within only a short period of time, NIS managed to obtain a number of reference customers. The breakthrough was made. The modest objective to sell 30 systems was far exceeded with 60 sold systems!

This was not the only success story for NIS. The successor system, "TALAS" (air quality control evaluation system), which the company launched in 1987, was sold 1200 times Europe-wide. Currently, the fifth generation of NIS emission control systems is in use, "TALAS/net" and "Umwelt-Office2005" (Environment Office 2005). These systems cover all relevant German as well as European guidelines.

The module design of "UmweltOffice2005" allows the use in small scale plants, for example, heat plants, gas turbines, and crematories, as well as the comprehensive monitoring of plants in different locations. The use of modern technologies such as web applications and databases is the foundation for the user-friendly and flexible concept of the system and guarantees low maintenance and operational costs. In

order to maintain our leading position in the future, the next generation emission control computer system is currently being developed. Its market launch is planned for 2012.

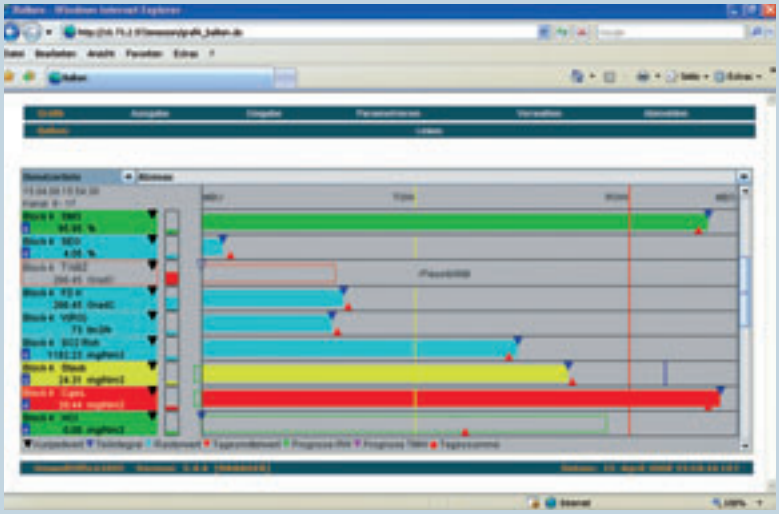
NIS reference list: a "Who's Who" of the German economy

Next to the energy providers E.ON and EnBW, utility companies such as Stadtwerke Düsseldorf (municipal utility of Düsseldorf), Stadtwerke Krefeld (municipal utility of Krefeld) and Mainova AG Frankfurt, and representatives of the chemical industry such as BASF, BAYER, Henkel and DOW Chemical are long-time customers of NIS. Especially noteworthy is our customer RWE, which commissioned NIS in January 2010 with the replacement of the emission computer systems at ten power plant locations. This has been the largest single order NIS received from this sector. Other customers include companies from the steel and automotive industries such as TKS Thyssen-KruppSteel, Hüttenwerke Krupp Mannesmann, Daimler, BMW, or Goodyear Dunlop Tire. A representative for customers from many other industrial sectors is Egger Holzwerkstoffe Brilon GmbH. The companies of the Egger Group have been Siempelkamp customers for a long time.

"TALAS" – our leap into other European countries

Important milestones could be recorded with orders for "TALAS" from Switzerland (Clariant Basel, Industrielle Werke Basel) and The Netherlands. In the latter case, NIS Ingenieurgesellschaft equipped the world's largest incineration plant, operated by AEB Amsterdam, with emission control technology. We are also especially proud of our business success in Ireland. With GlaxoSmithKline, Eli Lilly S. A., BMS, Novartis, Janssen and Roche, almost Ireland's entire pharmaceutical industry is our customer.

Visualization for the maintenance personnel



Furthermore, we installed systems in China and South America.

Market demand is stimulated by legislation

The attentive reader now knows that the described market segment did not arise from the needs of the plant operators but that it was generated by the environmental legislation. For plant operators, emission control is a necessary evil and has little added value. Investments in equipment are mainly the result of official requirements. Higher energy efficient plants, the relocation of production abroad, the replacement of many smaller reactors with a few large ones result in a weakened demand. Changes in the law, for example, due to the implementation of guidelines of the European Union, in turn stimulate demands.

NIS has worked on decreasing their dependency on such general conditions and market fluctuations. Early on NIS has learned to use its expertise in related business fields. Products that prove such actions are the software system "Emission Register" which is used in the generation of official offering memorandums or "TALAS/KWR," a system that is based on the emission system "TALAS" and that monitors the cooling water in combined heat and power plants.

A product is only as good as it is maintained

Early on NIS realized the need for service and established a competent service team. Meanwhile more than 100 systems at close to 50 different customers are serviced by long-term contracts including guaranteed reaction times and on-call services especially on weekends and holidays. Our efforts are rewarded with long-term and stable customer relations. We are offering excellent service for our systems in the area of emission control!

Short-cycle press for Kronospan:

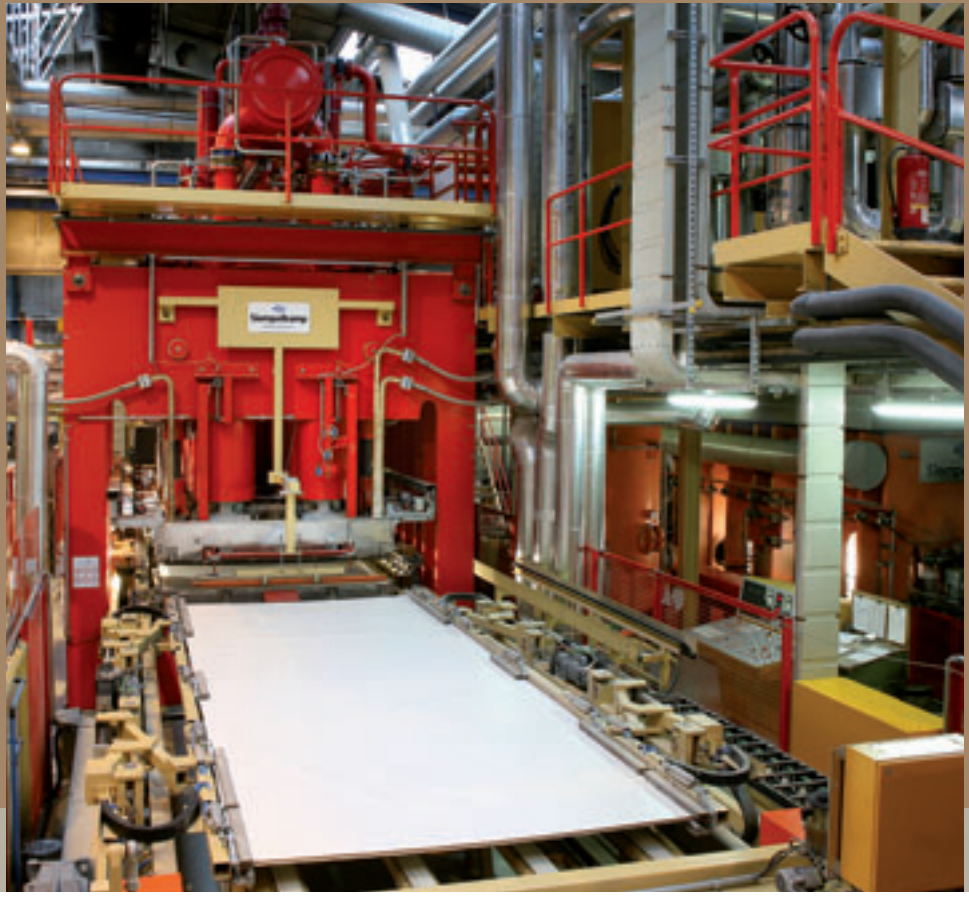
Precision in all levels

Established in 1966 the Kronospan Schweiz AG in Menznau produces and markets high-quality wood-based products as part of the Krono Group Switzerland worldwide. The company has relied on Siempelkamp support since its beginnings. The similarities between the companies are that both have a long-standing tradition as a family business, highest demands on products and customer satisfaction, and are involved in an intensive dialog in order to meet the set benchmarks. The latest example for this productive business relationship is a new Siempelkamp short-cycle press.

By Ulrich Bens

Among other products, the plant in Menznau produces particleboard and MDF which are laminated with decor papers at the Kronospan laminating center to resistant furniture boards. As a supplement to the already existing Siempelkamp paper storage, the company ordered in January 2008 a short-cycle press with a hotplaten dimension of 2.20 x 5.80 m for this center. The press is designed for 200 press cycles per hour, 180 press cycles are guaranteed for this press type. The projected daily capacity is 40,000 m², which amounts to 13.5 million m² per year.

The construction start for the short-cycle press was August 2008. The press was completed only three months later and reached full capacity in November 2008. This is the sixth Siempelkamp short-cycle press for Kronospan Schweiz AG – an indication for the customer's confidence in Siempelkamp over many years. The demands of the market in general and the demands of each customer in particular on the surface finishing of wood-based materials are very specific. Therefore, the benchmarks for custom-built short-cycle presses are set permanently higher.



Short-cycle press on the laminating end

In accordance with the Swiss customer's requirements, one of the latest short-cycle presses regarding the loading system, press, hydraulic system, and heat transfer was installed in Menznau in 2008. The highly precise lay-up is carried out by a loading device of the latest generation. The movements of this device are motor-driven which increases the operating precision. Given the fact that the impregnated papers react increasingly faster and generate an increasingly higher output, great demand is put on the device. Siempelkamp technology makes an unerring precision possible – one that is not at the expense of the enormous output. The press charges are placed inside the press in exactly the same location again and again. In this way, papers are aligned precisely. In order to receive products that

Short-cycle press on the discharge end

are difficult to distinguish from genuine wood in terms of appearance and feel, the precise positioning of the decorative paper on the embossed plate inside the press is essential for each press cycle. All loading and unloading processes of the press are therefore position-controlled to assure this type of precision.

Position-control is also used for the servo cylinders of the press lifting system. The individual control of the lifting cylinders allows for an active synchronization of these cylinders and makes the use of the formerly used synchronizing cylinders obsolete. The result is an exactly parallel moving upper beam which touches down gently on the product – a feature that is unique among the competition.

Also new is the temperature distribution. In preliminary discussions with Siempelkamp about the order, Kronospan had pointed out that an exact temperature distribution was an important requirement. The solution: With a cascading heating control, similar to the one used in the ContiRoll®, individually controllable heater circuits for product and opposite side, as well as improved sensors, the temperature distribution can be achieved with an even higher precision!

Siempelkamp's high standards are combined in this short-cycle press in many ways. Once more this press proves how complex the interplay of boards, papers, paper lay-up systems, loading systems, hydraulic presses, control and storage system technology is implemented into a successful unit.

High technical standards are not the only priority to our customers. "For decades Siempelkamp has offered us the best systems. In this respect this business partner is first choice for us. However, the reason for our excellent cooperation is also based on the good solution-oriented dialogs between our companies. The impulses and fundamentals which our products and markets are based on are immediately implemented into tailor-made solutions by Siempelkamp. This combination of intensive communication and custom-fit solutions is an important convincing feature," says Herbert Schneider, technical director of Kronospan Schweiz AG.

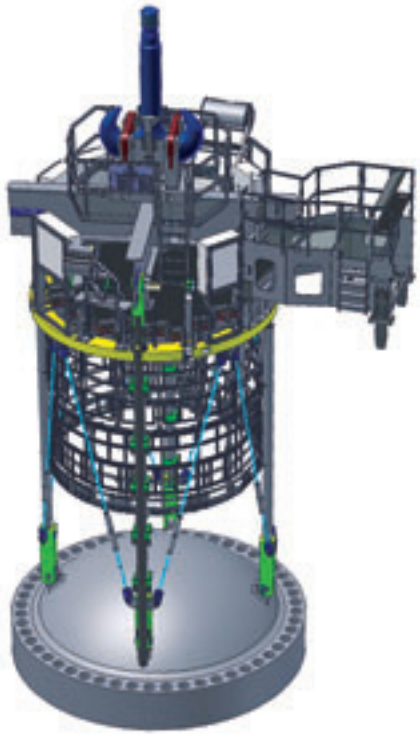
Quality test station

Products and services around the reactor:

No inspection without Siempelkamp products

The motto "everything from one source" is not just an empty phrase at Siempelkamp Nukleartechnik – especially when it comes to our services involving nuclear power plant inspections. The acquisition of new subsidiaries pays off through the many synergy effects from which our customers profit starting from the stud tensioning machine to the reactor head lifting device. Our virtual tour illustrates the processes.

By Christian Jurianz



Reactor head lifting device to be used at the EPR™ reactor

How does a nuclear power plant function? To a certain part just as any other conventional thermal power station. The generated hot steam powers a turbine, first in the high-pressure part, then, after drying of the steam and a reheating cycle also in the stages of the low-pressure part. The generator is connected with the turbine on the same shaft. The generator functions similarly to a large dynamo. In that respect, when it comes to the dimensions of a power plant one also talks about turbine generators. During the spinning of the generator, stator and rotor generate electricity which flows via transformers into the supply grid.

These are the similarities between the generation of electricity in coal-burning and nuclear power plants. The main difference is in the way the steam for the turbine is generated. While a conventional power plant burns fossil fuels inside a large boiler and at the same time heats water until the generated steam has reached the necessary temperature and water content characteristics, in a nuclear power plant a reactor is used. Inside the reactor are the fuel elements of uranium dioxide. For the nuclear fission process, a special enrichment is indispensable because only a small part of about 3 to 6 % of the material is fissioned by the chain reaction (see box).

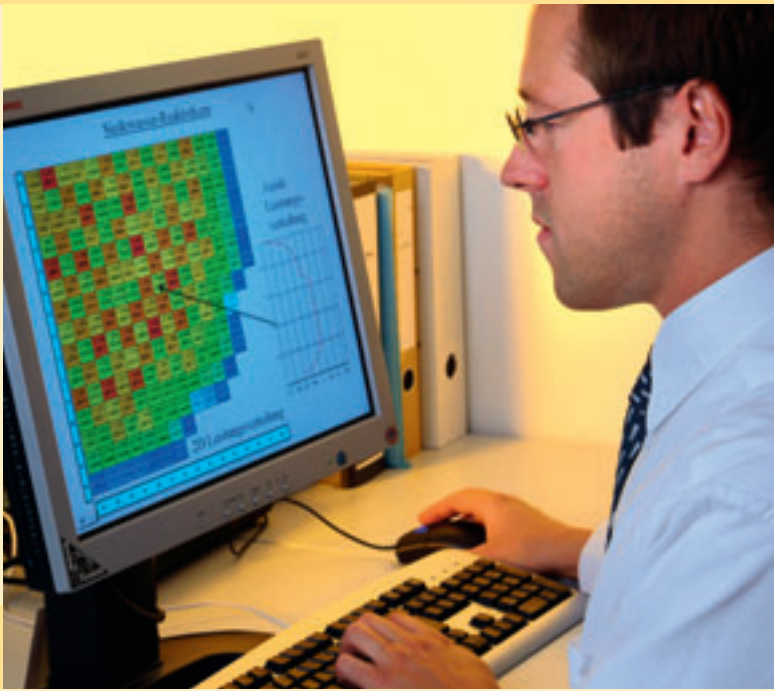
Inspection phase – our starting point

After a nuclear reactor has been operating for a while, the fuel elements have to be replaced. To do so, the nuclear fission inside the reactor is interrupted by means of control rods. This is also called reactor shutdown. At the same time the operator stops the turbines and all other systems of the power plant. The inspection phase can begin! During this phase the fuel elements are reloaded and rearranged and necessary inspections and repairs are carried out. To do so, first, the large head of the reactor (reactor pressure vessel head = RPV head) has to be opened. This is when Siempelkamp Nukleartechnik comes into play …

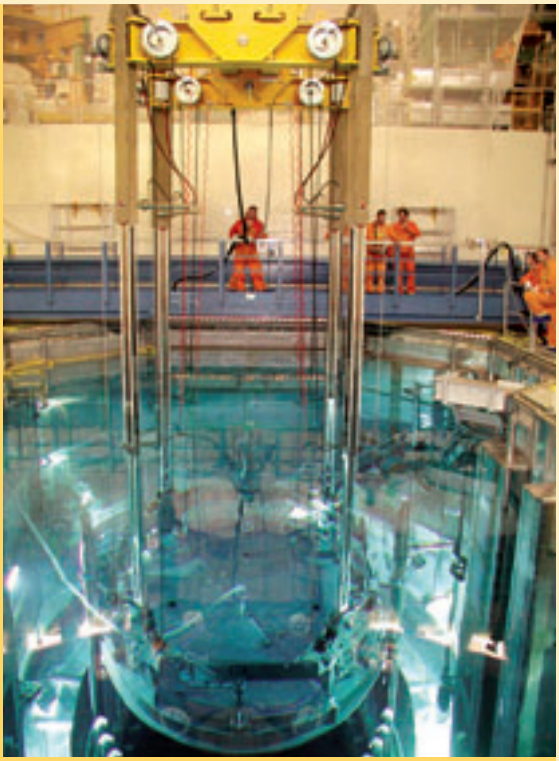
Multiple Stud Tensioners (MST) from **Siempelkamp Tensioning Systems (STS)** perform this type of work. The reactor studs with a length of 1.5 to 1.8 m and a diameter of 160 to 200 mm are first stretched and then the nuts are turned. A pressurized water reactor (PWR) has a total of 48 to 58 of these bolted (stud/nut) connections; a boiling water reactor (BWR) can have up to 92 studs. The Siempelkamp stud tensioners can loosen all reactor studs and nuts within only 1.5 to 2 hours. Stud dimensions, weight, and quantity differ between reactor types. Our machine can do even more. When the **polar crane in the reactor building** (which could also come from **Siempelkamp Krantechnik** or at least being modernised) lifts the stud tensioning machine from the RPV head, all the unscrewed studs are lifted at the same time. Remarkable weights are being moved: the dead load of a screw features between 180 and 300 kg, depending on the type of reactor.

The polar crane in the foreground with view of the refueling machine

The stud tensioner, along with the studs, is put down on a **STS-built set-down stand**. At this point the next product comes into operation, that is, the **stud removal and transportation device.** The remote-controlled stud removal and transportation device removes the studs so that they can be cleaned by **STS-made cleaning devices.** The studs have to be cleaned thoroughly before their next use so that the opening process during the next inspection will go smoothly. In the past the cleaning was done by hand. Today this job can be carried out in no time at all by our cleaning devices! Studs and nuts are cleaned via dry cleaning in one system – a sophisticated solution that is space and cost-saving!



Calculation of the step sequence for the reloading of the fuel elements



Transport of the RPV sealing head with the multi-purpose lifting device

In the meantime, the works on the reactor proceed. The crane has attached itself to the **special cross beam (by Siempelkamp Nukleartechnik)** which is now lifting the RPV head (RPV = Reactor Pressure Vessel) to a set-down structure which is also included in the **SNT** scope of supply. Afterwards, the **multi-purpose lifting device from Siempelkamp** lifts out the upper core structure. This process requires a high degree of precision from the crane operator as well as from the lifting beam. It is no miracle that these lifting beams are custom-made solutions by our engineers! Once the upper core structure has been removed from the reactor, the fuel elements can be reloaded.

If, during the fuel element reloading process in the PWR, no works on the primary system are necessary, a removal of all fuel elements from the core structure is also not necessary. Inside the PWR, the fuel elements can then be reloaded from the core into the wet storage pool and vice versa. This reloading process is carried out by the **"SHUFFLER" programme system** developed by the **nuclear physicists of the NIS Ingenieurgesellschaft.** The system results in a tremendous reduction in the time needed for the inspection. The step sequence for the plant inspection, which has to be approved by an official authority prior to the inspection, is mandatory and serves as precise instructions for the procedure.

Refueling machine

A refueling machine by **SNT** approaches automatically the programmed position of the fuel element in the reactor and grips the element approx. 13 m (42.6 ft) underwater. No mistakes are allowed during this process. The Siempelkamp technology guarantees the careful handling with the sensitive load and the safe transport of the fuel elements to the storage position in the fuel element pool.

The fuel elements are stored on a rack made by e.g. **NIS Ingenieurgesellschaft** until they are put into a Castor® for interim storage. Most of the **Castor® cask bodies** are cast at **Siempelkamp Foundry** and afterwards mechanically machined at the **SNT manufacturing center located in Mülheim,** Germany.

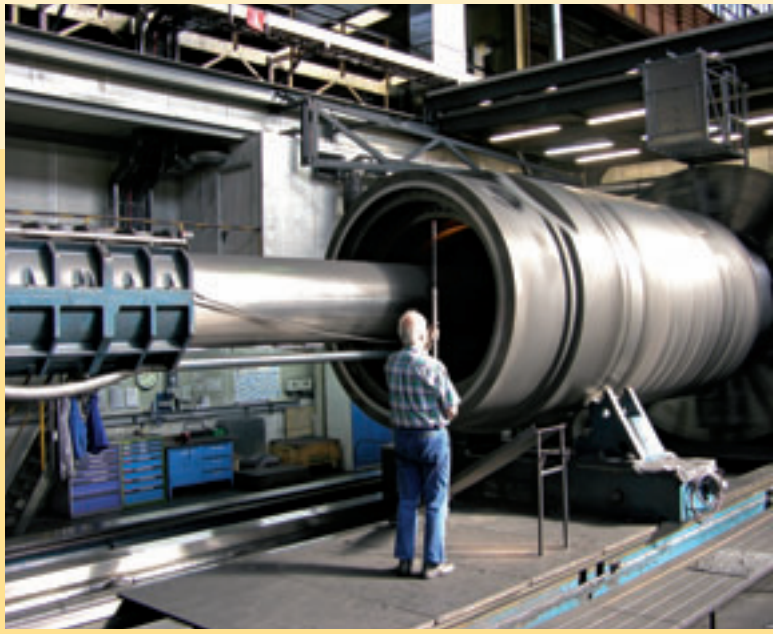
Back to our ongoing inspection: After the fuel elements have been reloaded and before the inspection of the steam generator is up, another Siempelkamp product is used. By means of the **SNT's multi-purpose lifting device,** the **RPV sealing head** is put on the reactor pressure vessel (we reported about this process in detail in our last Bulletin). This allows the safe and reliable execution of all inspections.

Multiple stud tensioner with unscrewed reactor studs on its way to the set-down stand

After these works have been completed precisely, the reassembly of the reactor can begin. The above described procedures are now carried out in reverse order with the help of the proven Siempelkamp components.

Let us take, for example, a nuclear power plant of the latest design type EPR™ reactor. An **SNT reactor head lifting device** puts the reactor head with a weight of approx. 250 t (276 US tons) together with the weighty draft shafts with millimeter precision back into its position. The stud tensioner will then make sure that the connections between the reactor pressure vessel and the reactor head are tight.

During our virtual tour around the reactor we started way up with the polar crane, moved around and then down into the reactor to the fuel elements. Now let us spend some time in the "basement" of the reactor building. This is where the **Core Catcher** is located.



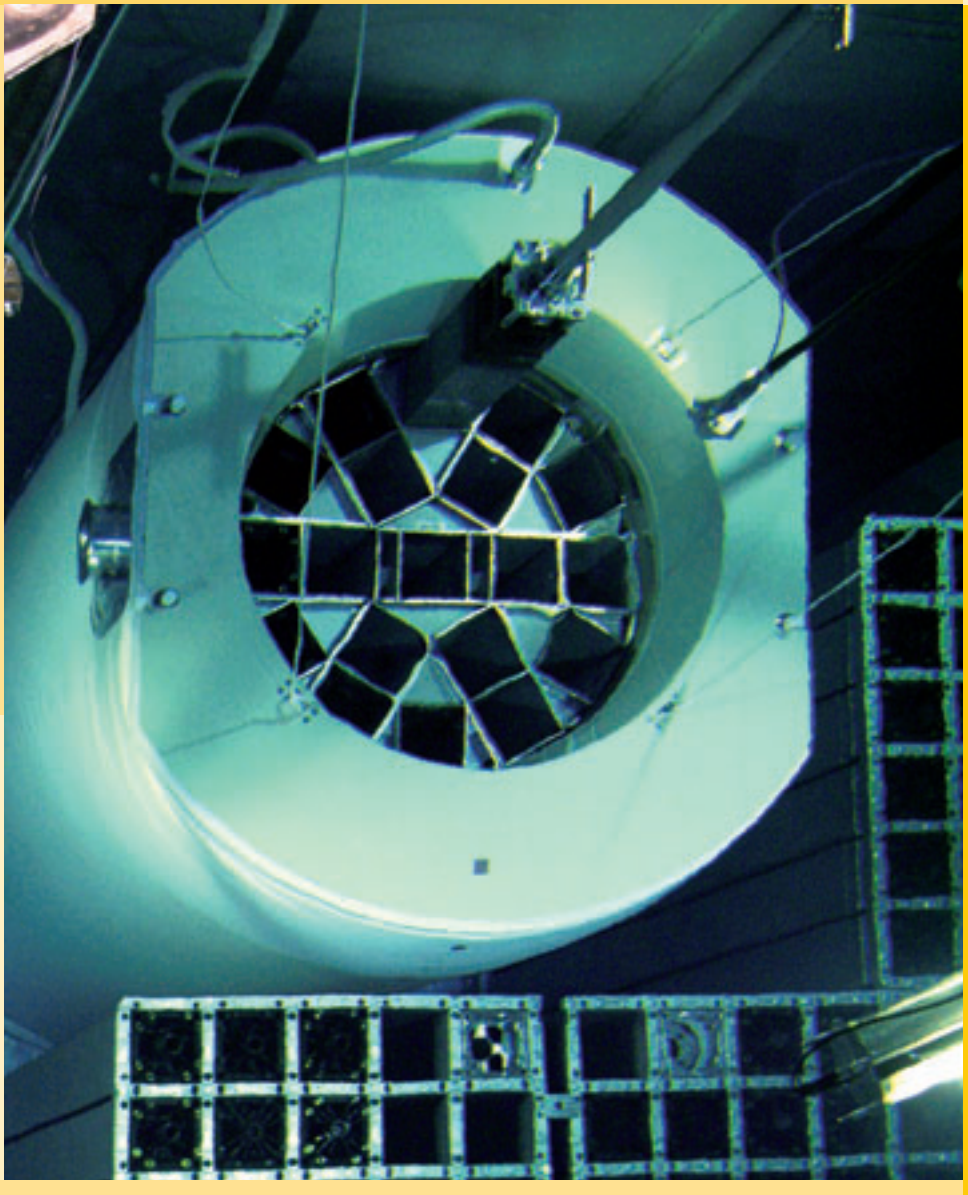
Castor® cask body during mechanical machining

The cooling structure for this passive safety system was manufactured at **SNT** and put together similar to a puzzle from over 900 individual parts. In the unlikely event of a core meltdown, this system causes the molten mass of steel, uranium, and other fission products to solidify. The spreading of the radioactivity outside the nuclear power plant is, in this way, safely and reliably prevented.

In many German nuclear power plants at least one of our components can be found during the inspection operations. Oftentimes, several Siempelkamp products are in use. In light of the versatile component spectrum, we can rightfully claim that proven Siempelkamp quality has prevailed.

A possible nuclear fission chain reaction: a neutron collides with a uranium isotope

- During this collision, the uranium absorbs the neutron, fissions into two smaller isotopes releasing two additional neutrons
- These neutrons continue to move through the reactor and collide with other isotopes
- The collisions result in more neutrons and fission products
- The chain reaction is in full swing!
- The chain reaction is controlled by means of control rods and the water inside the reactor which will slow down the neutrons
- The slowing down of the neutrons results in friction which heats up the surrounding water
- Due to the existing current, this water is pushed through pipelines out of the reactor to a steam generator where it flows through small pipes
- Outside the pipes, the water of the non-active cycle heats up until it starts evaporating
- The generated steam spins the turbine – and the process starts over!



Reloading of the fuel elements from the fuel element storage racks into a CASTOR® container

Siempelkamp components for the inspection operations

Siempelkamp Nukleartechnik (Nuclear Technology)

- Refueling machines (new plants / plant upgrades)
- Polar cranes (new plants / plant upgrades)
- Multi-purpose lifting devices
- Sealing heads
- RPV head set-down structures
- Reactor head lifting devices
- Castor® cask bodies (mechanical machining)
- Core Catcher Cooling Elements
- Special Cross Beams

Siempelkamp Tensioning Systems

- Multiple stud tensioners (MST)
- Set-down stands for MST
- Stud removal and transportation devices
- Cleaning devices for studs and threads
- Manipulators / lifting systems

NIS Ingenieurgesellschaft (engineering company)

- Shuffler programme system
- Plant process computer systems
- Fuel element storage racks

Siempelkamp Krantechnik (crane technology)

- Crane technology

Siempelkamp Giesserei (Foundry)

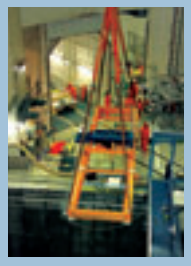
- Castor® cask bodies (casting)

Synergy effects are effective: NIS Ingenieurgesellschaft mbH and Siempelkamp Krantechnik GmbH

Decommissioning and dismantling of the nuclear power plant Stade from one source

By Andreas Loeb

The two latest additions to Siempelkamp Nukleartechnik have taken their first steps for a successful cooperation in the dismantling project of the nuclear power plant Stade. A team of experts from NIS Ingenieurgesellschaft mbH has been involved with the dismantling, disassembling and packaging of the reactor pressure vessel including peripheral equipment at the nuclear power plant Stade since February 2008. In March 2009 NIS commissioned Siempelkamp Krantechnik with the production, delivery and assembly of a gantry crane for the scheduled dismantling assignment in the control area of the nuclear power plant Stade. Once again Siempelkamp proves that the approach to deliver products and services from one source is the right and successful way!



Top (from left to right):
- Delivery of the crane system and beginning transport through the material lock
- The transport through the material lock is completed – the crane arrives in the containment area
- Folding out of the crane pillars

Bottom:
- Adjustment of the crane above the fuel element pool

Dismantling project Stade: the status quo

After more than 30 years the nuclear power plant Stade went off line on November 14, 2003. After the disposal of the fuel elements, the plant has been running in site-mode operation since September 2005. Currently, the operations within the scope of the approved dismantling phases I and II are ongoing. NIS Ingenieurgesellschaft mbH has been commissioned with the dismantling, disassembling, packaging and disposal tasks of the reactor pressure vessel which are part of phase III. During this phase the reactor pressure vessel has to be lifted out of the reactor cavity and is disassembled in the fuel element pool after the boron treated water was removed.

For the disassembling of the reactor pressure vessel, NIS has planned and commissioned the production of differently complex equipment. This includes a gantry crane which transports the dismantled reactor

pressure vessel segments to Konrad or MOSAIK® containers.

Though a crane system is available at the nuclear power plant Stade, the large reactor building crane is suitable to only a limited extent for the disassembly of the reactor pressure vessel. There were several reasons for the new crane. Next to the activities for which NIS will use the new crane, the nuclear power plant operator needs the crane for other purposes. Furthermore, the disassembly and packaging of the segments takes place inside a ventilated housing surrounding the dismantling area. This makes a self-sufficient crane necessary.

A crane for all needs

Siempelkamp Krantechnik GmbH (formerly E&W Anlagenbau GmbH) won the bid for this 5-ton gantry crane after a Germany-wide bid invitation. Among all bidders, the crane specialist, based in Moormerland (Germany), presented the most convincing concept of a gantry crane that will have to perform a variety of different tasks.

The bridge crane carriage and the lifting device had to be designed with redundant backups so in case the electrical drives become faulty, the radioactive load can be put down in a safe place. Furthermore, an electrically rotating hook block was required in order to move the load remotely to a precisely defined location and position inside the Konrad container. Another advantage: The SPS-supported position measuring system with a repeat accuracy of 3 mm will result in tremendous time savings during the camera-controlled move of the loads to their positions. Another feature designed by Siempelkamp Krantechnik GmbH is a fold-out attachment on the trolley. The crane is equipped with a gripper tool that can open and close the sliding roof of the ventilated housing. This presents a special design that should not be underestimated. The sliding roof is part of a complete housing made of the trapezoidal cross section of the former fuel element pool in which now all disassembly processes take place.

When planning the crane, flexibility was a necessity. NIS, as the customer, had to redefine the project repeatedly and even had to request changes to some parts. The good and smooth cooperation between the responsible project managers Reinhard Hoffmann from NIS and Ute de Vries at Krantechnik is noteworthy. Changes to the project were quickly checked for feasibility

The crane on four pillars inside the control zone

The nuclear power plant Stade during the dismantling procedure

and costs and then quickly implemented within the calculated budget.

This type of flexibility as well as the well-thought-out concept with many highlights resulted in a pleasing milestone. During the acceptance test at Siempelkamp Krantechnik in Moormerland, the crane was completely demonstrated to us. It was approved by the German Technical Inspection Agency and the customer. The chosen technology for the crane assembly convinced the people in charge at the nuclear power plant Stade. Except for the control box and the panel, the gantry crane was delivered fully assembled along with retractable pillars.

Retractable pillars result in time savings

Siempelkamp Krantechnik GmbH also proved its competence for detail during the assembly. The crane could only be brought into the reactor building through a material lock. The opening hours and opening duration of the material lock were limited. Precise coordination with the nuclear power plant in that matter was very important in order to quickly and smoothly pass the crane through the lock. The transport dimensions of the crane had to agree with the dimensions of the lock.

The disassembly of the crane pillars was not necessary for the transport through the lock. Inside the containment, the existing polar crane lifted the gantry crane package and the four pillars were simply folded out. Afterwards, the crane was put directly onto the rails. This mechanical assembly procedure took only four hours. Once again the crane specialist from East Friesland had delivered a technically savvy and special crane design. In December 2009, NIS has started using this crane in assembly pro-cesses of other facilities.

Currently, the start-up and complex testing of all dismantling systems is upcoming. Directly following this testing phase will be the dismantling of the reactor pressure vessel. We will report on this procedure at a later time.

Vestas Blades:

For cutting-edge wind energy technology

Not too long ago, it took two workers to manually paint a blade for Vestas wind turbines. Nowadays, the blades are automatically transported through the paint shop on RoundTracks® and treated by a specially programmed paint robot. This novel method is more environment-friendly because it minimizes the paint consumption and enables immediate cleansing of the tools. Moreover, a central exhaust now provides for fresh air in the workshop.

By Derek Clark

Vestas Blades are employed offshore and in desert fringes. "A single type V90-3.0 MW wind turbine saves more than 5,000 tons of CO_2 emissions per year," says Vestas' logistics manager Bernd Noatnick. The company's most successful model, the V90-2.0 MW, is optimally suited for low-turbulence sites with low to medium wind speeds. Vestas supplies the global market with this specific model. From the East German city Lauchhammer, they are transported via the river Elbe to customers in Europe and overseas.

Going near and far

Every four hours, somewhere in the world a new wind turbine from Vestas goes on the grid, and every four hours, the Lauchhammer plant completes another rotor blade for the turbines. "We sell complete stations," says Noatnick. Employing a staff of 500, the East German subsidiary, which has been operating in Lauchhammer since December 2008, is one of the major employers in the region. The premises which span 201,000 m² are located on the site of a former coal mining area and briquette factory. Here, Vestas currently manufactures rotor blades for type V90 wind turbines. The blades, which measure 44 m, have a hub diameter of 1.8 m and weigh 6.5 tons. At maximum rpm, the tips of the blades reach a speed of 300 km/h.

Vestas wind turbines have a characteristically slender silhouette. "Designing the turbines Vestas pays particular attention to material efficiency. Vestas towers rest on a steel structure. Our primary aim is to make them very light and lean," says Noatnick. "Other manufacturers' blades are more than twice as heavy as ours. To make our blades light and robust, we enforce them with carbon and seal the surfaces with a two-component system." A blade set consists of three blades which must be precisely adjusted by means of a pitch system because unbalances would damage the turbine. Noatnick explains that "the rotor blades must withstand extreme stress for a set time. Their intended operating life time is 20 years."

Flow production optimizes the painting process

The rotor blade is automatically transported through the paint shop on trolleys which run on tracks laid in the hall floor. It is automatically cleaned and treated by a paint

44 m long and weighing 6.5 tons, the blades can be pushed by two workers

Transport trailer loaded with a Vestas blade – ready for the long haul

On the RoundTrack®, the parts are automatically driven through the paint shop

robot. The blades are painted with two paint components. The paint robot automatically switches the color at the right position. "Minimizing paint consumption was a demanding goal and a major reason for introducing the RoundTrack® floor rail system. Thanks to this new technology, we save paint and help preserve nature," says Noatnick. In the next step, the painted blade is stored in the drying chamber. Throughout the process, standard-compliant ventilation is ensured. "Work safety regulations also required reorganization of the painting process. Now, we no longer need workers inside the paint shop during the painting process," Noatnick says. "Safety comes first for us. The RoundTrack® floor rail system greatly contributes to a high level of work safety throughout the factory. The tracks are smoothly laid in the hall floor – that is another advantage of the system."

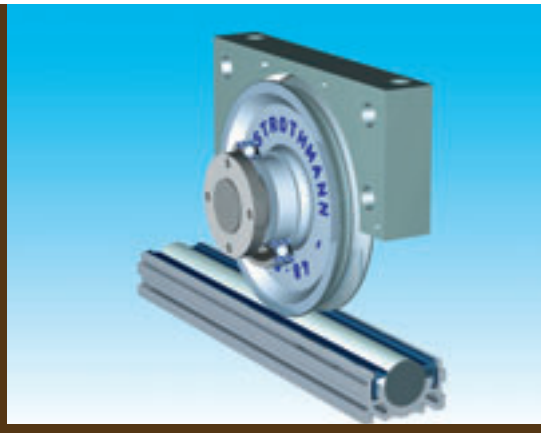
A tested and proven system

Handling expert STROTHMANN invited Vestas to view the RoundTrack® floor rail system in a plant of STROTHMANN customer Demag Cranes. "We must be able to rely on solid technology. At first, we were skeptical. We thought the grooves would soil too much but that was not the case. Everything is running smoothly. Looking for the optimal solution, we wanted to choose a proven system which works without flaws. STROTHMANN's RoundTrack® convinced us," says Noatnick. The RoundTrack® floor rail system is optimally suited for transporting heavy loads with little effort. One person can manually move loads of up to ten tons. "Manually moving the 44 m long rotor blade only takes two to three persons, depending on their constitution," says Noatnick.

"We are very satisfied with the system. We have even ordered extra trolleys in order to optimize the work flow," says Noatnick. Vestas has invested a small five-digit sum for two trolley pairs – a relatively small price for the new possibilities the RoundTrack® provides. If, for example, in-factory transport necessitates a change of direction, this can be easily realized by means of crossing elements or turntables. Crossing elements form rectangular track intersections, connecting four rails. The trolleys can be easily raised and lowered by moving a lever. For a change of direction, the trolley is positioned on the crossing.

RoundTrack® features

- Flexible handling for a wide range of production steps, including changes of direction.
- Closed assembly cycle:
  In flow-production applications with a set clock rate, the parts proceed on their platforms to the next station.
- Customer-specific production processes:
  e.g., several tracks laid next to each other, connecting single manufacturing cells.
- Low rolling resistance:
  The platforms move on rollers whose special profile ensures that contact with the rails is limited to two small surface areas. Even heavy loads can therefore easily be moved into the required position for assembly.
- Short installation time:
  RoundTracks® can be installed in existing production facilities within a few days, even during production.
- Work safety:
  The round upper edge of the rail protrudes only a few millimeters from the ground, allowing persons or vehicles to pass over the tracks without any risk of accident.



STROTHMANN's RoundTrack®

The hub of the 44 m long blade has a diameter measuring almost 2 m

Company background Vestas

Established in 1987 with a staff of approx. 60, Vestas, a pioneer in the field of renewable energy, has become the leading international corporation in the industry, and now employs a workforce of more than 20,000. Vestas Wind Systems A/S consists of the divisions Vestas Blades (rotor blades), Vestas Towers (wind towers, metal forming), Vestas Nacelles (nacelles, generators), and Control Systems. The company also operates a tight network of regional subsidiaries. Vestas commands a 23 % share of the global market and a 31.2 % share of the German market.

First plate processed on straightening press:

Kick-off ceremony for Dillinger Hütte!

Tool installation

The straightening of the first sheet plate completed a Siempelkamp order on March 10, 2010 and was the start of a successful addition to the machine park of the Dillinger Hüttenwerke AG. During the following trial operation the new heavy plate straightening press at the Dillinger heavy-plate rolling mill facility demonstrated what exactly it can do and with what precision it can do it.

By Ralf Griesche

The assembly of the straightening press, which Dillinger Hüttenwerke AG ordered from Siempelkamp in 2008, started in October 2009. Up to 30 technicians were on site in Dillingen during the crucial phase of the assembly. Outside companies were used especially for the heavy assembly operations.

The Saarland company plans to use the straightening press to flatten heavy plates and slabs in order to eliminate possible irregularities from the production process. The press is designed for sheet plates made of material grades with a tensile strength of up to 1,200 N/mm² and a thickness between 50 and 300 mm (1.9 and 11.8 in). If needed, thinner sheet plates can also be processed. 'Everything is possible' is the motto concerning the straightening spectrum. Plates with a width ranging from 1,000 to 5,200 mm (3 to 17 ft) and a length ranging from 1,500 and 19,000 mm (5 and 62 ft) are flattened. These plates have a weight of up to 60 t (66 US tons) and can be straightened cold or hot at a temperature of up to 600 °C (1112 °F). The straightened steel plates have to meet high demands, for example, as the supporting components of bridge constructions, extension arms of mobile cranes or ship hulls.

Regarding the weight of the heavy plates, we had to deal with a special challenge: "When a 60 t plate falls down from a height of 50 cm (1.6 ft), the roller table is subject to an enormous impact. Here, the hydraulic damping of the roller tables in front of the press has to be designed in such way that the construction is not going to be significantly damaged by a fall. Consequently, a complex substructure, which can withstand these heavy weights, is necessary," explains Jochen Reintges, Siempelkamp project manager for the straightening press project. Also not an every day event, the roller table, on the side where the plate is measured, behind the press has to be absolutely flat so that irregularities of 1 mm per 1,000 mm can be detected by the alignment ruler.

Visual judgment more important than automated processes: precision from the beginning

"Why so much precision for a preliminary product?" could be the question in light of this precision work. The obvious answer: "The higher the precision is from the beginning on, the less machining allowances are necessary for subsequent production processes for the buyers of the plates. Considering the demands that our customers make on us, the demand for totally flat plates has become our absolute focus," says Werner Finkler, project manager at the Dillinger Hütte AG. Here, the new equipment hits the bull's eye. The press can make heavy plates which are precision-straightened and of which the surface evenness fulfills the tolerance class S of DIN EN 10029.

The straightening process demonstrates that visual judgment is more important compared to automated operation: Many important parameters for the process are manually started by the press operator. These include, for example, press force, pressing intervals, straightening speed, and overextension. All this can be manually pre-selected and determined. Prior to the press process, the plate is measured to determine irregularities. Then, the operator decides what type of processing is suited best for the flattening of the surface profile. With the help of an alignment ruler, the achieved flatness of the plate is inspected. If the desired flatness has not been achieved, the process is repeated with new parameters. "A lot of it is experience,, which means, the press operator knows the press from the inside out," says Mohamad Waked, Siempelkamp site supervisor.

To be on par: straightening press operator team work

For Siempelkamp as well as the operator Dillinger Hüttenwerke AG, it was important to get familiarized with the press before the test operation in Dillingen started. The team of straightening press operators practiced on a real-life straightening press on the Siempelkamp premises. For four weeks Jörg Schneider from Dillingen and his colleague from Krefeld Dietmar Unterberg dedicated their time to the special demands of the straightening process so as to not lose time when it came to starting the straightening processes with the press at Dillingen. As far as the straightening principle and design of the press were concerned, both straightening press operators had the same knowledge level at the start of the test operation in Dillingen.

Heavy metal inside the tables

Installation of roller tables

All from one source

The proven Siempelkamp principle 'all from one source' also came into play for this project. The press was supplied as a complete package including development, construction design, assembly and start-up. Furthermore, the scope of supply also included the casting of the bolsters and the vertical tensile members of the frame, their machining on Siempelkamp heavy-duty machine tools, as well as the tables in front and behind the press. The entire oil-hydraulic and electronic controls for the straightening press were also designed and built at Siempelkamp.

The upper bolster of the press is equipped with two movable rams that have a press force of 32.5 MN each. Their cylinders are servo-hydraulic controlled. Each cylinder pair can be individually moved as well as together. Mounted beneath each pair of cylinders is an individual ram tool for straightening. A special feature: An aligning tool allows the connection of both hydraulic cylinder pairs. By using the aligning tool, a combined 100%, that is 65 MN, of the straightening force of the press can act on the plate.

Siempelkamp has a solid foundation at Dillingen

By the way, the heavy plate straightening press is the third Siempelkamp press operating at Dillingen. For 40 and 20 years respectively, two Siempelkamp flanging presses with a press force of 22.5 and 25 MN have been operating at the metallurgical plant.

The good reputation from past projects was not the only reason to buy Siempelkamp competence again. The Krefeld factory houses a 'Schiess', one of the largest portal milling machines in the world. Siempelkamp started operating this machine in 2008 to mechanically machine exceptionally large parts. The machine stands for high precision machining. It has a milling capacity of 100 kW and machines parts with a mounting length of up to

Everything ok! Jochen Reintges and Mohamad Waked

Last inspection prior to the straightening process

The hydraulic damping of the roller tables

22,500 mm (74 ft), a width of up to 7,000 mm (23 ft), and a height of up to 6,000 mm (20 ft). This large-sized machine made the upper bolster for the press with a final length of 9,783 mm (32 ft), a height of 3,300 mm (10.8 ft) and a weight of 250 t (275 US tons) almost look small.

"Very satisfied!"

With that much fitting accuracy from the beginning on, it was no surprise that the assembly and start-up took place to the fullest satisfaction of the customer. "Very satisfied!" commented Werner Finkler from Dillinger Hütte on the new straightening press. His colleagues from the Krefeld team concluded: "The cooperation with our colleagues from the Saarland was outstanding. For all details and challenges that this order included, one thing proved to be true: Man is the best computer!"

Record project – record key data

With the first straightened plate on March 10, 2010, Dillinger Hütte AG celebrated an important milestone with the new straightening press. During production of the press in Krefeld, two important key dates were marked red in the calendar!

May 19, 2009: For the upper bolster of the straightening press with a raw casting weight of 252 t (278 US tons), Siempelkamp poured 270 t (297.6 US tons) of molten iron with a temperature of 1,350 °C (2,462 °F). This event outperformed the existing world record from 1998. Within two minutes the molten iron was poured from five pouring ladles simultaneously into a mold. There, the iron solidified and cooled. This procedure was not only record-breaking but it was also spectacular to watch.

October 5, 2009: The finished upper bolster left for Saarland, Germany. On a heavy-duty vehicle it was transported to the Krefeld port. From there it went via a ship on the rivers Rhine, Mosel, and Saar directly to the factory port of Dillinger Hüttenwerke.

Werner Finkler and Jochen Reintges

Straightening of the sheet plate

Krefeld location with hall extension of 100 m (blue)

Location development in Krefeld: Siempelkamp's investment program is continuing

By Reinhold Krings

In 2010 the expansion of the Krefeld location is again an important item in the Siempelkamp strategy plan. In 2008 and 2009, the Group invested approx. 54 million Euros in new production equipment. This trend continues in 2010. The Group will again invest tens of millions of dollars in the expansion of existing and the development of new capacities. Along with the international expansion of the Group, the domestic production capacities are best positioned to meet the demands of their markets.

Structure of the hall

Vertical boring and turning mill

A fire bomb from World War II – found during excavation

After additional production capacities opened up with the completion of the new 3,000 m² production hall at Siempelkampstrasse, the second construction phase has started. A new hall with a length of 105 m (344 ft) and a height of 22 m (72 ft) will make another 3,000 m² production area accessible. This is another step Siempelkamp is taking toward an exceptional center of excellence for the machining of very large steel parts and castings.

A vertical boring and turning mill with a faceplate diameter of 10 m (33 ft) will be installed in the new production hall. With the help of extended beams, which are mounted to the faceplate in a star-shaped arrangement, the mill can machine large parts with a diameter of up to 16 m (52 ft) manufactured at the Siempelkamp Foundry. Therewith, it is representing yet another step towards the gapless service chain of the Group! Operations that are currently still performed by external contractors can then be carried out 'at home'.

The work on the footings for the milling machine has already been completed. Next, the foundation will have to be poured. This will consist of 3,500 m³ of concrete being laid in one continuous pour lasting three days.

Siempelkamp is committed to the most efficient processes. This approach does not stop at the hall exit but continues down the streets leading from the hall to an official railroad connection. Thus, workpieces can be directly transported from the production hall to the railroad. With piece weights of up to 450 t (496 US tons), this is a considerable logistical advantage that will help reduce truck traffic considerably.

Gantry-type portal milling machine: high performance and precision

Another milestone regarding the development of the location: In March 2010 the Schiess GmbH in Aschersleben, Germany, performed a test run with the second gantry of the Gantry-type portal milling machine VMG 6 PS which Siempelkamp had ordered. This universal milling machine can turn, drill, and mill. With a milling spindle capacity of 100 KW for heavy-duty machining, the machine combines high performance with high precision. With a length of 26 m (85 ft) and a height of 13 m (43 ft), it can process workpieces with a height of 6 m (20 ft) and a width of 7 m (23 ft). The Gantry-type milling machine is the first of this size used in Germany.

The advantage: The machining center will provide Siempelkamp and its customers with significantly expanded capacities for the highly-precise finish-machining of large parts. The casings for large diesel engines for ships, extra-long hot platens as well as large press tables for multi-daylight and metal presses are some of the components that are machined here. No matter how large these products are, precision work takes top priority. The Gantry-type milling machine provides reliable services.

Very soon these services will become fully available. The preliminary work for the April installation of the second gantry, consisting of the casting and installation of the saddle, has been completed. Thereupon, the Siempelkamp teams can carry out machining task on the machine table and the faceplate simultaneously.

New office building – the think tank of the future

To continuously meet the market demands of the future, a new office building and training facility will be built at the Siempelkamp location in Krefeld. Next to a state-of-the-art IT facility for data processing, data protection, and data storage, a building with bright and open offices will be constructed.

The ground floor will accommodate the reception, information technology facilities, and offices. More offices and a real-life control station can be found on the first to fourth floors. Seminar and meeting rooms will be located on the fifth floor. For the top floor, the construction plans call for the use of OSB module elements which were designed by one of our most important customers. This customer is currently building a three-story administrative building of this construction type in Eastern Europe. The new Siempelkamp building will be finished by the end of September 2011. Until then much more detailed planning will be necessary and will receive our fullest attention!

Titanium sponge compacting press for UKTMP:

The foundation for a high-

The Kazakh titanium and magnesium supplier UKTMP placed an order with Siempelkamp which has been regarded as the ultimate accolade: The company in Ust-Kamenogorsk commissioned the Krefeld specialist with a compacting press for titanium sponge. The installation of this press with a capacity of 2 x 80 MN is almost complete with the start-up to begin shortly after. Once again Siempelkamp has positioned itself as one of a few manufacturers in the world that has experience in the compacting as well as the forging of titanium. In light of the fact that titanium is difficult to form, this detail is noteworthy!

By Egbert Schulte

Titanium is a light and high-strength metallic material which is generally used in the aerospace industry. Titanium sponge, however, is an extremely porous intermediate product developed during titanium production. In order to compress the sponge, an additional process step, the compacting of the sponge, becomes necessary (see box) For this step, the new Siempelkamp press is used. Siempelkamp has been building corresponding presses for a long time and has gained comprehensive know-how in this application area.

The scope of supply contains the design, manufacture, delivery and installation of the press including the electrical and hydraulic control system. A complex die change system as well as different press tools are also part of the order. Furthermore, the Siempelkamp team will perform several onsite services including the monitoring of the installation, the start-up and the calibrating of the entire press.

Double-sided action leads to higher quality

The distinct feature of the new press is its double-sided action. Because it has a press capacity of 2 x 80 MN, it generates an extremely high specific forming pressure which so far is new for the compacting of titanium sponge in presses of this dimension. With a diameter of 1,800 mm (5.9 ft), both cylinders are king-size. Advantages of the high forming pressure include: The resulting compacts have a high density and, consequently, are easier to process.

The double-sided action of the Siempelkamp press provides customers with a pre-product which is easy to process. The manufacturing process of titanium is a high-quality process which will lead to equally high-quality components at the end of the process chain. The strict test criteria in the aerospace industry demand high product quality. Knowing how important quality is in the manufacturing process of titanium, it has been the ultimate accolade for us that UKTMP has decided to buy a Siempelkamp press. With our press we can contribute to high quality and optimal products throughout the entire process chain.

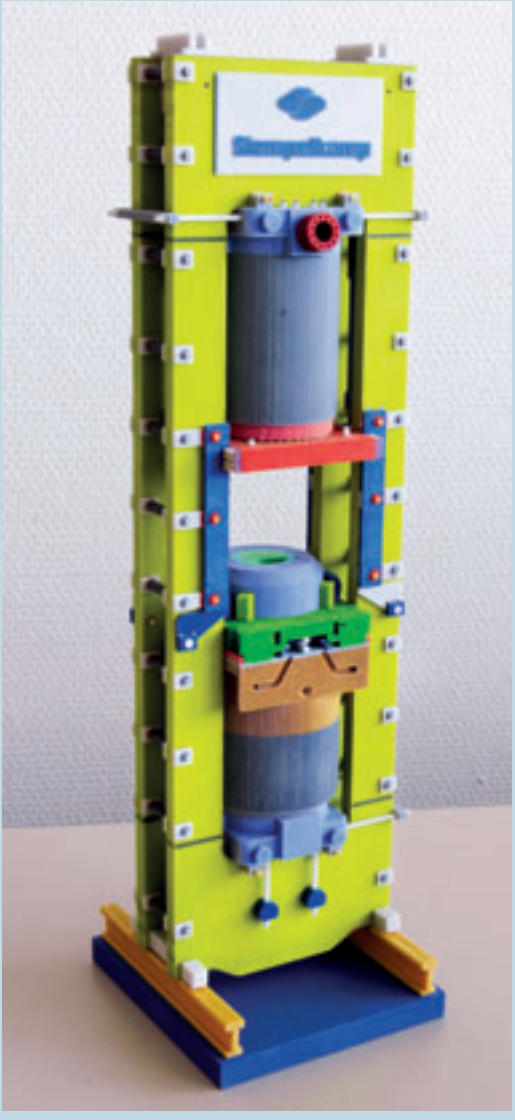
Siempelkamp's involvement in this project was not limited to manufacturing an excellent product with a high press capacity. Siempelkamp also had to ensure that the press capacity was right for the process and guarantee a uniform and highly dense compaction. At the same time the stresses on the dies had to be optimized. Siempelkamp carried out simulations and tests in the forefront to meet these demands and achieved excellent results.

UKTMP: high-quality titanium

Siempelkamp's main focus in the cooperation with UKTMP was to supply excellent products and services to an ambitious customer: The Kazakh company is one of the world's only fully integrated producers of titanium. Furthermore, the company is one of the leading accredited suppliers of titanium to the aerospace industry worldwide. The company's activities range from titanium mining to titanium sponge production to the production of semi-finished titanium products such as ingots.

Kazakhstan – art on the building

quality process chain



Model of the compacting press for titanium sponge

Production and compacting of titanium sponge: from titanium tetrachloride (TiCl4) to a sponge electrode

Apart from Kazakhstan, titanium sponge is primarily produced in Russia, Japan, and China. For the production of titanium sponge, titanium tetrachloride is needed. In the industrial production this compound is usually created using the Kroll process. In this method, the chloride is reduced with magnesium metal resulting in titanium metal and magnesium chloride.

In the beginning of this process, magnesium is melted inside a reactor at a temperature of 700 °C (1292 °F). The resulting magnesium chloride is a liquid which settles on the reactor bottom due to its density which is higher than that of titanium and magnesium.

The titanium sponge, however, forms a hard solid above the magnesium melt. As a result of capillary action through the porous titanium sponge, the magnesium rises to the surface and continues to react with the TiCl4 gas. Once the magnesium, which was put into the reactor, is used up, the supply of TiCl4 is stopped. Today this process occurs primarily through vacuum distillation.

The titanium solid is then removed from the reactor and crushed to smaller pieces. During a roughing stage, a guillotine first shears off larger lumps. During a subsequent fine stage, these pieces are crushed between rotating rollers.

The resulting titanium sponge is a porous metal which is the starting material for the production of semi-finished titanium-based products. It can also be converted into a usable alloy in titanium-stabilized high-grade steels.

The next process, the compacting of titanium sponge, requires Siempelkamp products and services. First, the sponge is compacted in a press. This process produces compacts. If required, alloying elements, necessary for titanium alloys, or small titanium scrap pieces are added to these compacts.

The compacts and additions are joined together by plasma arc welding to make the consumable electrodes. Due to the high oxygen affinity of titanium, this process takes place under an argon inert gas atmosphere. This atmosphere prevents the titanium, which heats up above melting temperature during welding, from combining with oxygen to form TiO2. To ensure even quality, the welded electrodes are re-melted at least twice in a vacuum arc furnace to become titanium or titanium alloy ingots.

From Krefeld to Kazakhstan:

The transport of the UKTMP compacting press was a logistical masterpiece

The technological journey of the UKTMP press from production to installation was long, literally speaking 6,500 kilometers (4039 miles) long. Siempelkamp's scope of services includes the handling of transports over such distances as well as the necessary activities at the production and customer site after arrival. In the case of the compacting press, three different transport solutions became necessary.

By Andreas Tenberken

Many factors influence how a Siempelkamp product is delivered to the customer. Cost-effectiveness takes top priority. Furthermore, the location of the production center and the consolidation to loading and forwarding offices describe important key data. The urgency, for example, in regard to a preset time frame for customs to take place, is important. Moreover, the condition of the infrastructure in the target country also influences the transport decisions.

Last but not least, seasonal weather conditions set natural limitations on transport procedures. In this regard, it is important to exclude pre-identified unfavorable conditions and allow for alternative routes to reach the destination. An example: "For deliveries to Kazakhstan and through Russia respectively we have to take the spring thaw into account. During this time, usually from April to mid May, numerous roads become impassable. Another season-related obstacle takes place in Poland in midsummer. The asphalt heats up to such an extent that some roads have to be

Machining of the frames on the Schiess at the Siempelkamp plant

blocked for heavy goods vehicles," reports Andreas Tenberken, who is responsible for logistical and commercial processing at Siempelkamp. Even waterways are influenced by seasonal weather changes, for example, when rivers freeze up and ship locks become impassable. Therefore, transport by water does not represent an alternative during certain times of the year.

In the case of the compacting press for UKTMP, these types of conditions made a combination of three different transport solutions necessary. In close cooperation with the Kazakh customer and a long-time freight forwarder, Siempelkamp developed in Krefeld a complex logistics concept.

Custom-fit logistics provided with three solutions

Solution 1 was developed for the extremely large and heavy parts of the press. The four press frames and the hydraulic unit were transported via truck from Krefeld to Lübeck, Germany. From there the parts

Installation of first frames

Frame pairs provide safe transmission of powers

The press frames are installed

Installation of the upper cylinder

Lower cylinder

The shell construction of the press is finished

were shipped to St. Petersburg, Russia. Next, a truck delivered the parts to the final destination Ust-Kamenogorsk, Kazakhstan. With five weeks, this phase took the longest considering that the entire transport lasted six weeks. "For this solution, the challenge was to find an alternative solution to transport on Russian railroads. The Russian track gauge does not permit the transport of goods with a width exceeding 3.90 m (12.8 ft). With a width of 4.65 m (15.3 ft) our frames were too wide for the Russian railroad and, consequently, made a transport combination of truck and ship necessary," says Andreas Tenberken. With a dimension of 16.36 x 4.65 x 0.59 m (53.7 x 15.3 x 1.9 ft) and a net weight of 55,000 kg (60.6 US tons) per frame, the four frames of the compacting press were true heavy weights.

Solution 2 was developed for those parts of the press of which the dimensions permitted transport by rail but which were still too large for a standard transport. This regarded

Rail transport

Special crates at the port

the cylinder units as well as the upper and lower pistons which were delivered in a time window of four weeks as part of an oversize transport. These parts were transported via truck from Krefeld, Germany, to Mukran, Germany; then, via ship in two days to Klaipeda, Lithuania, where the Russian railroad starts. From here, the parts were transported via railroad to Ust-Kamenogorsk within three to four weeks. This logistics solution included a special transport solution: The die change carriage with a width of exactly 3.90 m met the limit of the Russian track gauge and, therefore, had to be transported separately from the other parts through Russia. After careful inspection, the Russian railroad approved the transport on a special route in order to avoid obstacles on the side of the railroad.

Solution 3 delivered, via standard truck transportation, the smaller parts directly to the site of the Kazakh customer. For this transport, the shortest time frame could be estimated, that was two weeks. For the finely-tuned interplay of all three solutions, the following was important: "For the entire delivery process we had a tight customs window of only 30 days. As soon as the first delivery opened this window, all subsequent deliveries had to follow quickly according to schedule," describes Andreas Tenberken. If a delivery within the customs window cannot be kept, fines, next to delivery hold-ups, are inevitable. The die change carriage, which was transported separately through the Russian farmland, kept our logistics team in a state of suspense until it finally arrived in Ust-Kamenogorsk three days prior to the expiration of the customs window.

At the destination within the allotted time

All transports were completed within the agreed time before the expiration of the customs window. All other parameters from this point on were managed by UKTMP, Siempelkamp, and the freight forwarding company themselves. The three partners had done their homework in the forefront of the delivery. During a site visit in Ust-Kamenogorsk, the involved parties made sure that no disagreeable conditions were to be expected, for example, in regard to height limitations at the site.

For the reliable processing of the transport, the Russian railroad contributed a pleasing part. Siempelkamp received a precise daily status update about the respective position of the railway cars. "The status report was something that we have not so far experienced from other countries, including Germany," says Andreas Tenberken. Reliable update reports for the customer are an important support mean. Also pleasing was the hospitality that was shown to our logistics team at the Kazakh site during shared meetings. "Contacts, communication, and accommodation were a great thing!" – such is the unanimous opinion of the Siempelkamp team.

Trainee project 'Crimping Press':
Shared responsibility instead of tunnel vision

By Bernhard Sander

Already for a second time Siempelkamp trainees have launched a pretend company within Siempelkamp. After the first project by the name of Mini-ContiRoll® was completed, a team of Siempelkamp trainees from different departments developed, within a new Mini-Company, another press model according to a real-life model. The result is a miniature crimping press based on a press for Europipe, which was delivered to the management in March 2010.

A total work of art

Trainees from commercial-technical and commercial training fields disproved once more the stereotype that people in sales and production only work in their own orbits without experiencing the complete interplay of the different company divisions. 'Shared responsibility instead of tunnel vision' is the motto of this second trainee project.

From purchasing to production, the project mini-crimping press proved to be well-balanced. Since mid-July 2009, Siempelkamp trainees from three different classes and all departments planned, designed and built the model. Their model was a crimping press that Europipe, the specialist for pipelines based in Mülheim, Germany, ordered from Siempelkamp at the end of 2007. In real life, this press carries out the first of three forming steps, the initial bending of a piece of sheet metal, for the production of pipeline pipes. Two subsequent presses, the U-press and the O-press, complete the forming process of the pipe. With a maximum force of up to 11,000 t (12,125 US tons), the real-life crimping press is able to bend the edges of a piece of sheet metal up to 18 m (59 ft) long and ranging in thickness from 7 to 50 mm in feed intervals of 4.5 m (14.8 ft). Due to its high press capacity, the press can also form sheets made of higher-tensile grades which Europipe's customers are increasingly ordering. According to the size, the press can form between 33 and 42 sheets per hour.

Siempelkamp's rich experience in the area of bending presses for the production of pipes was utilized in the trainee project. The idea to use the Europipe press as the role model originated by the trainees themselves. They launched the project together with their instructors and the work council. While a model maker contributed

many performance parts for the first trainee project 'Mini-Conti-Roll®', for the crimping press project the trainees produced almost all the parts themselves. That comes as no surprise because the second project generation was able to build on the support and experience of the pioneers from the first project who provided their successors with start-up aid.

The original Europipe crimping press was replicated in a true-to-life model with dimensions of 420 mm (depth) x 620 mm (width) x 650 mm (height). It incorporates numerous functions, for example, six electric motors which activate the press. The model press can even bend sheet metal as long as it is made of aluminum. In relation to the original press, the bending radius is implemented on a scale of 1:25. Just as with the original press, the trainees implemented not only the base model but also the corresponding pipeline model.

Real-life actions just as in real companies

Beyond the actual result, the journey that leads to the final product is the reward of the trainee project. "On a small scale, the trainees learn how a real company functions. They find out how commercial and technical processes function and have to technically think through and develop a complex product," describes Bernhard Sander, commercial training manager. Bernhard Sander acts as the 'gray eminence' of the trainee project and is the interface with the real-life Siempelkamp company. The task spectrum of the commercial pretend businessmen included all tasks that would also be necessary for a real project at Siempelkamp including determining and evaluating the demand, carrying out pre-cost analyses, and determining costs. For the manufacturing processes, the task spectrum included determining the operability and the design faults during the assembly, that is, "to accompany the creation of a Siempelkamp press from beginning to end just as in real life," says Bernhard Sander.

Even advisory board meetings were part of the program. They demonstrated to the trainees how the responsible people have to give account about their work on an actual customer project. Twice a year the management of the trainee project had to document their work in front of the advisory board consisting of the managing director Dr.-Ing. Hans W. Fechner, the commercial as well as technical managers and the production. The question: "What was done in what way?" had to be answered just as detailed and sophisticated as in a real-life project. Concrete profitability analyses, preliminary calculations and technical drawings had to be presented to the board during that time.

MiCo: The Mini-Company becomes a definite authority

Recently the trainee project was completed. The deadline for the delivery of the project was March 22, 2010. In the case of the miniature crimping press, the product was not delivered to a customer but to Dr.-Ing. Hans W. Fechner. The complex model is best suited to familiarize oneself with Siempelkamp know-how in a miniature size. The model of the crimping press will therefore be presented at trade fairs, for example, at the 'Tube' in Düsseldorf, Germany, in April. The miniature ContiRoll®, originating from the predecessor project, was shipped to the 2009 'LIGNA' fair in Hanover, Germany. The objective was to present customers and interested parties with a demonstrative impression of the business activities in Krefeld. Furthermore, the pretend model was to reflect the talent of the company's trainees on delivering deliberate results just as Siempelkamp staff in real life. This also included the pressure to comply with deadlines, in our case to have the project completed before the 'Tube' fair.

The idea to make the trainees personally responsible for their involvement in the company context has become a concept at Siempelkamp after the second project was completed. "Within the scope of a mini project, each class will be given the opportunity to familiarize itself with Siempelkamp with higher intensity and complexity compared to classic training," explains Dr.-Ing. Hans W. Fechner. The short name of the first project, MiCo for Mini-Conti-Roll®, has now received overall validity. Future projects will be institutionalized as MiCo which will from now on stand for Mini-Company.

The hydraulics of the press

Knowledge transfer in the Mini-Company:
"Better from round to angular than from angular to round!"

The project group

What knowledge gained from the project did the trainees value most? As the managing director for the technical side of the project, Daniela Reiser benefitted mostly from the communication between all participants and the knowledge transfer resulting from it. "The work on the miniature crimping press has shown me how important the communication between the divisions is. An example: From the trainees in production we learned that it is simpler to machine a round blank into an angular part than the other way round. That was important information for our purchasing department," reports the 21-year-old.

Another benefit: The realization that small faults in the beginning of a process will grow into glaring defects according to the pyramid scheme. "It quickly became clear to us: If the first person works negligently, the extent of a fault grows bigger during the scope of a project," Daniela Reiser and her fellow-trainees noticed.

Within the actual, but nevertheless safe setting of the trainee mini project, the trainees had the opportunity to learn to evaluate the impacts and responsibilities of their actions: "We have gained important knowledge in the area of material science. The miniature crimping press consists of aluminum. At first, we used the same material for the threaded spindle. This is where we were faced with problems. The power transfer through the motors is not guaranteed when friction between the same materials, that is aluminum on aluminum, takes place. This meant to purchase a new spindle which, this time around, was going to be made of steel," describes Daniela Reiser, who is completing cooperative engineering training at Siempelkamp. This means that she is completing training as a drafts-woman at Siempelkamp and at the same time she is studying mechanical engineering in her fourth semester. Her overall conclusion: "This project has advanced me forward and showed me what relevance my work has in the cross-departmental structure. Many of my fellow students envy me because they are not provided this type of opportunity in their companies."

Simon Wahlicht, the Mini-Company managing director for the commercial division, adds further benefits from the perspective of his field of work: "For our project we requested the services of many suppliers and compared them. Thus, we gained a close impression of competition and operating efficiency. In our calculation we accounted for the full cost pricing as well as the actual financial accounts. Altogether we operated as though we were a real-life company including personnel costs, rental costs for the machinery in the training workshop and other factors which were not obvious to us at first sight," explains the 22-year-old who is also completing a dual education. He is receiving training at Siempelkamp to become an industrial business management assistant with a scheduled completion of May 2010. Furthermore, he is completing a Bachelor of Arts in Business Administration.

Higher individual responsibility – more identification with the project

Rudolf Gall, training manager of the commercial-technical division, sees the main benefits of the project in the intensively experienced responsibility of all participants for the entire project. "The integrated aspect has convinced everyone that was involved in this project. How often does it happen that employees only get to know a limited spectrum of the company they work for, oftentimes, only their own work area! We want to avoid this. The contact between the individual departments has helped our trainees to comprehend interrelations, tap into interfaces and to interact with one another. This interface dynamics and the practical component prevent tunnel vision!"

First MDF plant for the Ukraine:

Art-Progress takes off with Siempelkamp support

Art-Progress in Kiev, Ukraine, is forecasting to produce the first board toward the end of 2010 on a new MDF line which the company ordered from Siempelkamp. The first Ukrainian MDF plant at the Korosten location is expected to produce 250,000 m³ of MDF per year with a board thickness ranging from 3 to 35 mm. Currently, the preliminary construction is challenging the teams in different areas. In particular, the extremely hard winter has initiated some new developments and thus has defined a new but none the less goal-orientated tempo.

By Kurt Sommer

For this project Siempelkamp acts as the general contractor which supplies a turn-key plant all the way to the start-up. The forming and press line including a 9' x 35.4 m ContiRoll® press is the main item in the scope of supply for the MDF plant located in Korosten in the Zhytomyr Oblast. The press can be extended to 40.4 m (133 ft) if desired at a later date. Art-Progress – a company new to the wood industry, believes in the motto "all from one source". The planning and engineering was carried out by Dr. E. Schnitzler Industrieplanung and the energy plant was provided by Siempelkamp Energy Systems (SES). Art-Progress is proud to be able to operate the

Energy plant

Drying tube

Shell construction of ContiRoll®

Matformer bunker for resinated fibers

line without the use of natural gas. The SES energy plant is fired by biomass.

Siempelkamp bought the equipment for the debarking to the refining processes from the Finnish Metso company. Siempelkamp's subsidiary Büttner supplied the dryer. The scope of supply also includes cooling and stacking, finishing, and packing lines as well as a storage system by Siempelkamp Handling Systeme (SHS). Siempelkamp's production location in Blatnice also contributed to this project: Seven months after the opening of the 2,600 m² production site in the Czech Republic, a matformer bunker for Art-Progress was completed and shipped to Korosten in July 2009.

From May to September 2009, a total of 280 trucks left involved Siempelkamp locations to deliver line components to the site in Korosten.

Investment with foresight

Korosten has 66,000 inhabitants and is located in the northern part of the Ukraine. The town's old name 'Iskorosten' is very fitting for the future activities in the wood industry. 'Iskorosten' translates into 'walls with bark'. A total of 120 million Euro will be invested on an area of approximately 40 ha (99 acres). Close to 300 new jobs will be created. Next to MDF, the future manufacturing schedule also includes laminate flooring. The distribution system is based on the cooperation with retailers that will sell the product in their specialty stores. Art-Progress will open up another channel of distribution via the cooperation with manufacturers and home improvement stores.

In a second instance the company sets its sights on additional prospects including the production of siding material and molding strips. In the interim, a furniture production is planned. Furthermore, it is planned to produce the urea-formaldehyde-resins for the operation in-house.

Art-Progress, so far primarily known as a company belonging to a group that deals with realty, enters a new business sector with the plant in Korosten. The recent entry of the company into the wood-based products industry promises numerous potentials. "The Ukrainian MDF market has a volume of approximately 350,000 m³ – an amount that has so far been provided exclusively by imports. With Art-Progress lines we can supply a large part of that demand," says Roman Prisiazhniuk, Managing Director of the plant. The laminate flooring market represented with 9 million m² in 2009 promises additional potential. This demand has so far been satisfied with imports.

The main principle: as closely to the raw material as possible

The excellent raw material situation was one of the decisive factors that spoke for the Korosten location: The administrative district by the name of Zhytomyr is one of the areas in the country with the most wood. Here, the stock of wood amounts to approximately 200 million m³. 60% of the area is wooded with pines and other coniferous softwood. The remaining 40% are covered with oaks, birch trees, alders, and aspen trees. The coniferous wood population, especially the pine trees, are relevant for the production at Art-Progress. Another determining factor for the selection of the location was the good transport connection to the infrastructure. A railway hub and the proximity to important transport routes were advantages that spoke for Korosten.

Furthermore, the plant is located closer to Moscow, Russia, than any other comparable Russian operation. This is a good condition for a successful approach to exports to the Commonwealth of Independent States. Art-Progress has already received orders from Russia, Belarus, and the Iran.

The basic prerequisite for such milestone projects is the reliable support of the local government agencies. Art-Progress has had the agencies on its side: "The agencies know how important the project is for the town, the region as well as for the entire Ukraine. We have their full support," explains Roman Prisiazhniuk.

Siempelkamp support: rough climate – calm climate

Siempelkamp's degree of innovation for products and services was also decisive for the order. "The special feature of our equipment is the fact that it is state of the art. When we negotiated with Siempelkamp about the scope of supply we emphasized that we want the latest technology that is available at the time of the signing of the contract. The result is that we have a brand-new operation without used equipment. We are convinced that we will produce high quality products for our customers with the purchased equipment," says Prisiazhniuk.

On the part of Siempelkamp the Art-Progress project was marked by many opportunities and challenges that proved our in-house competence. The equipment installation takes place simultaneously with continuing operations on the foundation of the plant. Here, the harsh winter has set clear limits. Temperatures which at times reached –25 °C (–13 °F) slowed down the progress of the work tremendously.

The handling of the order proved to be very complex. "Because of the many regulations and laws, contracts with countries of the former Russian Federation have to be prepared delicately. We had to account for many details which are unusual for western standards," explains Kurt Sommer, Project-manager at Siempelkamp.

Presently, four Siempelkamp representatives are working at the site of the new MDF plant. They especially praise the excellent cooperation on site. The interpersonal climate to the local construction supervisor and his teams has been much more favorable than the real climate!

Snow and coldness at the construction site

Installation of the fiber dryer

Siempelkamp

G. Siempelkamp GmbH & Co. KG

Machinery and Plants

Siempelkamp Maschinen- und Anlagenbau
Siempelkamp Maschinen- und Anlagenbau GmbH & Co. KG

Siempelkamp Handling Systeme
Siempelkamp Handling Systeme GmbH

Siempelkamp Energy Systems
Siempelkamp Energy Systems GmbH

Siempelkamp Logistics & Service
Siempelkamp Logistics & Service GmbH

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

Siempelkamp
Siempelkamp CZ s. r. o.

Büttner
Büttner Gesellschaft für Trocknungs- und Umwelttechnik mbH

Sicoplan Engineering
Sicoplan N.V.

atr
ATR Industrie-Elektronik GmbH

Strothmann Machines & Handling
W. Strothmann GmbH

CMC TEXPAN
CMC S.r.l.

hombak Maschinen- und Anlagenbau
Hombak Maschinen- und Anlagenbau 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

Singapore
Siempelkamp Pte Ltd.

Spain
Siempelkamp Barcelona

Turkey
Siempelkamp Istanbul

USA
Siempelkamp L.P.

Foundry

Siempelkamp Giesserei
Siempelkamp Giesserei GmbH

Siempelkamp Giesserei Service
Siempelkamp Giesserei Service GmbH

Nuclear Technology

Siempelkamp Nukleartechnik
Siempelkamp Nukleartechnik GmbH

Siempelkamp NIS Ingenieurgesellschaft mbH
NIS Ingenieurgesellschaft mbH

Siempelkamp Tensioning Systems
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Siempelkamp Krantechnik
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