



Siempelkamp

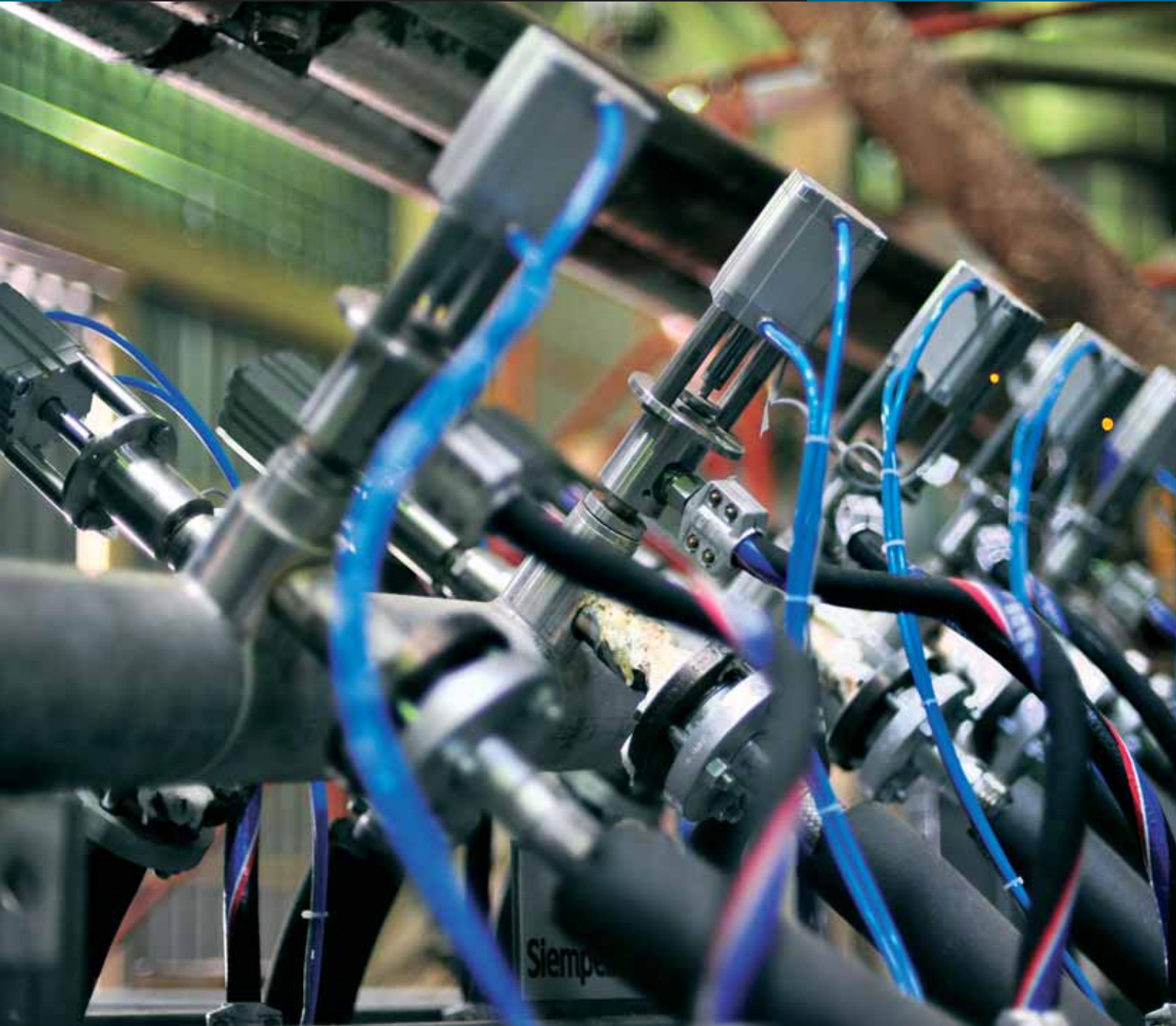
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**Interview with Dr. Dieter Siempelkamp:** Entrepreneur of the third generation  
**Siempelkamp Foundry is awarded Research and Innovation Prize:** Project "Megawind" on the upswing  
**Double record for Siempelkamp:** Dismantling of the Zion NPP

# bulletin

The Siempelkamp Magazine

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

## Dear Readers:

Customers make a decision in favor of a Siempelkamp plant or service for several reasons. One of them is Siempelkamp's long-time and broad experience.

Another strength gains wider market appeal: Our know-how to find and implement the right solution for any project so special it may be. This is exemplified in the available Bulletin edition.

An example of the wood-based industry: we design and supply new plants as reliably as we modernize and modify existing plants. By means of purchase and sale of old plants we provide for another feature of our performance. No matter which preference the customer gives to a type: there is no doubt that he is always given first-class advice in favor of the best solution.

An example of the foundry technology: Our advance in know-how and technology is strongly sought after – also and even in the high-tech fields. Siempelkamp's casting expertise is increasingly distinguished in the market for e.g. wind energy plants providing for a total of 1,000 casts per year. Beyond that casting expertise we successfully support operators of wind power plants if it is a matter of mechanical machining. Two specializations in one!

An example of nuclear technology: Here also we wisely combined our performances to a very special success: A US company with a German mother – Siempelkamp – was awarded the contract for the largest dismantling project on a nuclear power plant on the North American market. In the field of dismantling and decommissioning we score with many years of experience from more than 30 dismantling projects and with proven performances of various dismantling processes.

So different these track records may be: They are all based on the expectation of always offering the best answer. The latter one originates from the concentrated know-how of our group. Easy-going – but that's by far not to be taken for granted in the market.

Best regards from Krefeld

A handwritten signature in blue ink, appearing to read 'H. Fechner', written in a cursive style.

Dr.-Ing. Hans W. Fechner



Triple Talents for new machinery, modernization and second-hand equipment:  
**Siempelkamp's triple expertise**



**Siempelkamp's expertise in wood-based panel plants themed with "triple talent instead of monoculture": Customers can rely on new state-of-the-art plant concepts on the one hand. In addition to that modernization and conversion of existing plants form part of the range of products. The scope of supplies and services provided by Siempelkamp also includes purchase and sales of second-hand machinery and plants. By means of our example "particleboard plant for Panel Plus" lifecycle management is utterly illustrated!**

By Ralf Griesche

### One location, three competencies: Hat Yai / Thailand

Siempelkamp's triple expertise is expressed at one single location: Hat Yai, a big city in the South of Thailand.

In Hat Yai at the beginning of the nineties two particleboard plants and two MDF factories were built and equipped with Siempelkamp's ContiRoll® technology respectively. Also four short-cycle press lines made by Siempelkamp were integrated into the industrial complex, additionally a plywood production facility and varied furniture-manufacturing centers.

In the past 20 years the production site and equipment underwent a changeful history (see box). Siempelkamp's triple expertise is illustrated when having a look at the status quo:

1. The first particleboard plant (PB1) was installed in 1991/92 and modernized in 2005. Siempelkamp **re-bought** this plant in July 2011 from Panel Plus and **disassembled** it at the end of the year.
2. Particleboard plant number 2 was built in 1994/95. This plant (PB2) was significantly damaged on the takeover day in 2004 due to an arson attack and repaired in the same year – owing to the **conversion and modernization** expertise of Siempelkamp. At the end of 2011 the plant is modified and adapted again.
3. Currently, a **new plant** is under development on site: in 2010 Panel Plus placed an order for a new HDF/MDF-line. Starting from engineering until packing the complete Siempelkamp range of products is included.

### Siempelkamp know-how at the location of Hat Yai: history

- **1991/1992:** Realization of the particleboard plant PB1 for STA – including planning, all machines for wood preparation, forming and press line, cooling and stacking system, sanding line
- **1994/1995:** Realization of particleboard plant PB2 for STA – bigger type than plant number 1
- **1998:** During the Asian crisis STA got into financial trouble.
- **2004:** The machinery on site is sold. New owner of both particleboard plants is Panel Plus.
- **2004:** On the day of takeover of the particleboard plants the larger one of both particleboard plants is destroyed due to an arson attack.
- **2004:** A few months later a team of Siempelkamp experts renovates and modernizes the destroyed plant PB2. In September 2004 the first panel is produced.
- **2005:** Modernization of the smaller and older particleboard plant PB1 by order of Panel Plus
- **2010:** New order on one HDF/MDF-complete plant: Panel Plus decides in favor of a portfolio extension and thus in favor of a Siempelkamp plant!
- **2011:** Modernization of particleboard plant PB2 on behalf of Panel Plus
- **2011:** The smaller particleboard plant (PB1) is shut down, the personnel is taken on for the new MDF plant.
- **2011:** Purchase and competent disassembly of particleboard plant PB1 through Siempelkamp for resale





Forming-line



Screws will be reused



A. Degener



Debarker

### Conversion and modernization of particleboard plants PB1 (2005) and PB2 (2011)

By means of these two particleboard plants Siempelkamp could already prove twice its conversion and modernization know-how. In 2005 the first upgrade was performed: The particleboard plant PB1 was modernized and generally overhauled by replacement of numerous components as e.g. knife-ring flaker, glue application and batching systems, gluing machines and double-diagonal saw.

Furthermore, the plant was additionally upgraded due to the modern S7 control system for forming and press line and gluing as well as the related visual display systems. The capacity of the plant thus amounted to 350 m<sup>3</sup> per day.

Six years later Panel Plus decided again to place an order for modernization of a plant with Siempelkamp – this time for the larger plant PB2: Upgrade due to a

new heating plate concept. The inlet heating plates are directly heated now (power heating plate). An additional secondary pump station provides for increased and quicker circulation of the heat quantity. Benefit for the customer: higher application of energy to the product in the front heating plate area and thus improved plate quality and quantity.

In addition to that the press was equipped with a completely new chain guide, likewise with an electric control for the secondary heating circuit. In the inlet area the hydraulics of the press frames was modified to entail an improved density profile. Last but not least a spare parts package including all wear parts completed the contract volume.

Special advantage for the plant operator: The project was implemented within six weeks only between October and November 2011 so that only a very short downtime had to be included.

### New HDF/MDF-plant for Panel Plus in 2010/2011

In July 2010 Panel Plus signed a contract on delivery of a new Siempelkamp plant. At the Hat Yai location the company does not only provide for an extension of the equipment, but also of its range of products: Panel Plus placed an order for an HDF/MDF-plant to perform the entry into the MDF production.

The contract volume consists of a complete delivery enabling Panel Plus to achieve a capacity of up to 1,000 m<sup>3</sup> per day depending on the panel thickness. The plant is designed both for thin panels of 2.5 mm and also for panels of a thickness of up to 40 mm thus offering a maximum of flexibility regarding panel dimensions and thicknesses.

Starting from engineering to packing the entire Siempelkamp range of pro-



ContiRoll® during refurbishment



The Team (P. Kurczyk, M. Macha, M. Mewes, U. Panyo, G. Krabes)



Exhaust gas cleaning systems



Chipper



ContiRoll®

ducts is included: The overall plan was created through Sicoplan – the engineering department of Siempelkamp – also for this project. The scope of supply starts with the log pond via debarker, chippers, metering bins, screening equipment – all products made by Siempelkamp – to the dryer made by Buettner and fiber separator specially matched to the application of rubber tree timber.

The core of the plant – the forming and press line – is equipped with a ContiRoll® of 8' x 38.7 m of size – additionally provided with SicoScan measuring and control technology as well as a triple-diagonal saw, star cooler and a fully automatic storage system also made by Siempelkamp.

The sanding line including sanding machine and offline book saw allows for maximum flexibility in the finishing process. The line is additionally equipped with two fully automatic strapping lines and one packing line that are also supplied by Siempel-

kamp. The energy for steam generation, press and dryer heating is generated by an energy system with a capacity of 63 MW – likewise made by Siempelkamp! Optimal product quality is ensured by means of complete modules of the process control system ProdiQ® – business, quality and maintenance.

Last but not least Panel Plus decided to install an additional short-cycle line that will be delivered together with the complete HDF/MDF-plant. The plant will go on line at the beginning of 2012. Due to this plant Panel Plus is able to explore the future markets in the South of Thailand near the Malaysian border. Also China, Malaysia and India are considered as future prospects of HDF/MDF products. The well-connected port located in the South of Thailand (Songkhla) as well as other Malaysian ports offer optimal transport links.



Quality measuring equipment



Cooling and stacking



Dosing bin and Starformer



Digester and refiner



Energy plant



The Team with Dieter Kleine, Siempelkamp, and Teerapol Prakitchaiwatana, Panel Plus (1<sup>st</sup> and 2<sup>nd</sup> f. r.)





Glueing system



The forming- and press-line



Prepress and ContiRoll®

**Particleboard plant PB1: disassembly in 2011 – custom-made with systematic work organization**

In July 2011 another plant was sold between Siempelkamp and Panel Plus – this time the other way round: The company located in Krefeld rebought the smaller of both particleboard plants that had been operated for nearly 20 years at the Hat Yai site.

This disassembly is not a demolition, but follows an expert concept and clear systematic work organization. From the beginning of November 2011 to the end

of January 2012 a team of 33 experts is working in Hat Yai to disassemble the plant, to keep records of all activities as well as to provide for seaworthy packing before the transportation to the seaport Songkhla. The disassembled plant will be packed after basic cleaning both in containers and conventional shipping units.

The staff manages the disassembly of over 3,200 t totally. "Over 100 containers and 850 tons of parts packed in cases do not only pose a huge volume, but also an enormous logistic challenge," states Hans-Jürgen Busch, Pre-owned Machines Division at Siempelkamp.

In addition to that it is always important in view of second-hand machinery sales to keep an eye to the reassembly that means the identification of a large quantity of piece parts. "Here we have the significant advantage of cooperating with a partner company so that we are able to apply a professional marking system. Via bar code we can clearly classify all piece parts in fact continuously starting from the preparation of content lists for boxes and containers to the point of the packing list for the whole plant finally. A detailed documentation during disassembly with working sequence diagrams, disassembly sketches, photos and drawings is also



ContiRoll® infeed



ContiRoll® outfeed



The dismantling Team with D. Barbian and B. Caspers, Siempelkamp, (from the right)



essential to reinstall and restart the plant within a very short time at the new plant location,” explains Hans-Jürgen Busch.

Conclusion: An existing plant that was disassembled will be handled with identical care at Siempelkamp as a new one to be installed – and the new owner can count on identical first-class support!

And what is the advantage for a customer who purchases a second-hand plant from Siempelkamp?

**Only Siempelkamp perfectly knows Siempelkamp plants!**

The customer may rest assured of first-class advisory service! Starting from the plant layout for the new site of installation,

the know-how for conversion and replacement of the Siempelkamp range of products for frontend machines, forming and press lines as well as handling systems and finishing – altogether with Siempelkamp’s own machines from its own production and ending up with the professional disassembly and commissioning of the plant.

## New for old: Discover the possibilities!

### Sell existing plants: That’s how it works

Get in touch with Siempelkamp – ask for know-how

Technological check of Siempelkamp experts: status quo of the plant?

Quotation matched to the results of technological check

Signing of contract – and disassembly through the Siempelkamp team

### Buy existing plants: Start with new features

Get in touch with Siempelkamp – ask for plants

From ACTUAL to REQUESTED condition: What shall the plant perform at the new location?

Complete modernization (refurbishment) including warranty

optional

Upgrade with state-of-the-art components for improved capability

Upgrade, installation and start-up through Siempelkamp experts

New old equipment with new excellent performance!

# Triple expertise: questions and answers

Hans-Jürgen Busch, Pre-owned Machines Division at Siempelkamp



**New machines, modernization and second-hand equipment have been united in its product range through Siempelkamp. Is this know-how already available in the market or is it a real unique selling point?**

This combination is unique. Particularly the know-how for the process management as to "disassembly, appropriate refining as well as assembly and start-up at the new location of the new customer – and all from one source" is not available a second time in the market.

**What is the customer's benefit?**

We are able to offer different concepts to the plant operators depending on the market requirements:

- Purchase of a new plant with all features for uncompromising quality and outstanding efficiency

- Modernization of an existing plant so that the customer is provided with an improved market know-how
- Purchase of a second-hand plant with Siempelkamp functional warranty
- Sale of a second-hand plant to Siempelkamp to make way for new investments

Due to this flexibility we are optimally positioned at the market of machines and plants for the wood-based panel industry. The customer can optimally align his range of machines with the market and is able to implement concepts that are future-proof!

**The issue "Siempelkamp buys and sells second-hand equipment" was also topical on the occasion of the last "Ligna". What was the decision basis for this market presence – and what were or are your targets?**

For more than seven years second-hand ContiRoll® plants have been offered and sold in the market. Each time we were contacted through the new owner to discuss modernizations / upgrades and the related spare part requirements. Unfortunately in all cases the plants were already running or under assembly so that upgrades could not be realized any more due to structural reasons and / or technical interrelationships. Just the ContiRoll® plants do offer a great variety of optional upgrades to increase the plant performance and / or to improve the panel qualities. Not forgetting the measures by means of which the plant can be operated with increased reliability and less maintenance expense. Such possibilities can

only be suggested to the operator of a new machine whereupon most of the measures can even be implemented step by step over a longer period.

**Which conditions should be met to implement all that appropriately and according to the requirements?**

To explain all these options to the new owner Siempelkamp should be already involved before delivery to the new site of installation. That is the only way to schedule and implement in time indispensable preparatory works as e.g. foundation works and engineering activities. This gave us reason to thoroughly analyze the topic "second-hand plants". As a result thereof we concluded as follows: The second-hand plant is delivered to the customer through Siempelkamp who will provide for a tailor-made configuration to meet exactly the requirements of the new owner.

**How was the feedback to this concept at the "Ligna" 2011?**

The feedback there and likewise at other trade shows and in personal meetings was very good. With this concept we hit the mark as to requirements and expectations of the market. There's still to mention that this concept is not only applied for ContiRoll® plants, but also for short-cycle press lines. We could already record first successes – and I am confident of further projects that will follow.



# Value creation by Panel Plus

Interview with Amporn Kanjanakumnerd, Managing Director Panel Plus



How does the biggest sugar manufacturer of Thailand match up with a producer of wood-based panel products?

Mitr Phol group, our mother company, had been the largest manufacturer of sugar in Thailand for two decades. In 1991, we were having 300,000 tons of excess bagasse from producing sugar and it was the strategic decision to create

downstream value-added products and to venture into producing bagasse-based particleboard.

Mitr Phol however produces much more than sugar and wood-derived products – what is the strategy behind?

The Mitr Phol group has four business areas which are the sugar industry, the

Modernization of the existing ContiRoll®

bio-energy industry, the particleboard industry and the ethanol industry.

Starting from the sugar cane to bio-energy and panel businesses are all part of the strategic integrated value chain of the group. We not only add value to our sugar business, Mitr Phol produces clean energy in an environmentally friendly way.

What do you understand from the Panel Plus slogan "We promise to add values in everything we do"?

We focus on working with our customers to provide innovative solutions and products which help in giving them a competitive edge. In the end, this goes along with making us and them successful.

Our innovation leads to value-added products. Our proficiency and integrity will add values to our services. We exist to add values to our partners, employees and communities.



Amporn Kanjanakumnerd, Managing Director Panel Plus

Let's get back to the wood-based panel business: At present Panel Plus has been investing a lot of money in the Hat Yai location. What are the reasons?

Global MDF demand will grow at 5.5% per annum for the next five years due to high consumption growth rate. MDF has got a high product application potential and will add value to our existing production process and variety ranges.

As the existing particleboard plant was 16 years old, we decided to upgrade and modify the machine to the latest technology to be able to serve the customer demand and increase production capabilities.

With the additional new MDF plant Panel Plus turns to be turnkey supplier in the field of wood-based panels. What is the benefit?

We are market leader in value-added panel products, by adding the MDF line we would be a one-stop panel shop for our existing customers as well as for our potential new customers.

In terms of raw material optimization, we will be able to utilize both wood and resin for both particleboard and MDF production.

In the market of timber and wood-derived products there is a lot of competition. How is Panel Plus positioned here?

We have been focusing on the development of new surface designs for different applications. In doing so we became the

market leader of melamine-faced chipboards.

In addition to this we offer a great variety of different products: lightweight panels based on bagasse, particleboards for all applications and very soon also MDF of a panel thickness of 2 – 40 mm. With our commitment to customer success and continuous improvement in product and services, we create a good relationship and synergy with our customers.

How many percent of the raw boards are surface-coated (MFC) at Panel Plus?

At present the proportion of raw board to melamine-faced chipboard is approximately 50:50.

The melamine-faced panel segment has the highest potential growth of all total-surfaced lamination in Asia. We will increase production and sales of melamine-faced chipboards. We are promoting the application and benefit of melamine-faced chipboards to our customers, which is bearing fruit.

Which are the markets Panel Plus sells its products to?

Our customers are the furniture industry, wholesalers and retail. 70% of our products are exported to the Middle East, India, Malaysia, Australia and Japan.

How do you see the development of the market for wood-based panels for the next five years?

Construction in Asia has been growing in line with Asian economic growth despite the crisis in Europe and USA. The leading



Signing the contract at Panel Plus, Thailand



opinion is that the growth will boost particleboard and MDF demand accordingly. More houses and apartments will be built. This trend will go on for the next coming years. Additionally, we should be aware of the increasing urbanization. Furthermore, the taste of the younger generation regarding furniture style is changing. Furniture has to be practical and modern to comply with the prevailing taste.

**Are there enough wood resources in the market and has Panel Plus its proper plantation?**

For our bagasse plant we have an abundance of material.

Thailand has got the world's biggest rubber wood plantations. There is an abundance of rubber wood which no longer provide latex, and these areas are being replanted at the Southern part of Thailand. We still have got enough for our industry and now there are increasing

rubber wood plantations in different parts of the country.

**Panel Plus bought a complete plant from Siempelkamp including front-end, dryer, energy plant, forming and press line and finishing. What is the benefit for Panel Plus of that "equipment from one source"?**

We know the engineering know-how of Siempelkamp and have trust in it. A plant has to be professionally planned and designed. Siempelkamp provide us through their technical expertise with state-of-the-art machines and interface-free connections.

Timing is important. The plant should be commissioned within a minimum of time required for assembly and start-up. In addition to that it is beneficial for us that Siempelkamp now offers the complete frontend from wood yard to gluing system.

We are convinced that we have been provided with the best technologies and machines to run an economic production in the future. Our experience with Siempelkamp technology and support proves this statement.

**You appear to have great confidence in Siempelkamp?**

Yes!

The interview was conducted by Ralf Griesche.

# Siempelkamp's Ecoresinator: New MDF blending process provides up to 15% resin savings

A production process optimised according to cost factors plays a significant role for efficiency of the wood-based panel industry. In times of increasing energy and raw material cost this goal even becomes more important. Siempelkamp exactly knows where to begin and offers innovative solutions under the slogan "cut your cost!" also in the field of gluing.

By Ralf Griesche



The complete Ecoresinator system





In unbelievable amazement ...



... 25% of glue savings

With the Ecoresinator Siempelkamp offers a state-of-the-art gluing system with optimum cost-benefit relation. Siempelkamp developed this optimised gluing system that is based upon the 2-agent nozzle technology made by Schlick. The dosed blowing of hot steam provides for an optimised swirl of the fibres in the blowline – practically each fibre is wetted through the dispersed glue fog thus avoiding spotted glue in the board. On the one hand the improved gluing technology entails for identical glue and wood quantities improved technical properties, on the other hand this effect can be used optionally to reduce the glue and fibre volume. The possible glue savings for the Ecoresinator are up to approximately 15% and as a result thereof such a system is recommended for all MDF plants.

**Benefits for maintenance, investment and operation**

For an Ecoresinator comparatively low investments have to be made and it can also be used for a subsequent upgrade of an existing line. Within a few days the gluing system is installed and ready for operation. Operating cost compared to other mechanical gluing systems can be neglected since there is no additional consumption of electric energy. Maintenance cost and line shutdowns do not occur.

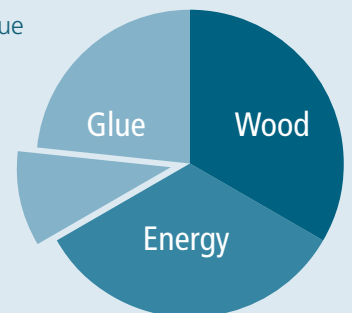
The Ecoresinator is offered as turnkey complete gluing system including switch cabinet and automation software. Due to the additional optimisation of ProIQ® system production data can be easily monitored to release further optimisations in the production process.

**The most effective investment for upgrading MDF lines:**

- quick installation
- low operational cost

**Your benefit:**

- significant reduction of glue
- better surface quality
- capacity gains





## Questions for Mr. Hüseyin Yildiz, Starwood

In 2007 you purchased from Siempelkamp a plant for the production of thin MDF equipped with a 7' x 28.8 m ContiRoll®. This plant has been running since mid 2008 – are you satisfied with the performance of the plant?

Our cooperation with Siempelkamp started in the 1960s when we took over a company with a single daylight press from Siempelkamp. Since then we have developed a very close partnership to this machine supplier. This being our 3<sup>rd</sup> ContiRoll® press at our plants in Inegöl, Turkey, it was no surprise to us that this machine would be running properly and fulfill more than its promised performance.

With speeds of 2,000 mm/second, this plant is economical regarding the production of MDF with a thickness ranging from 1.5 to 3 mm. Has this operating speed been steady and safe?

We primarily produce thin MDF with a thickness ranging between 2.5 and 4 mm on the 28.8 m long ContiRoll®. In order to produce such products economically, the system has to run at high speeds. We are aware that we are part of a small circle of plant owners that have been equipped with such a high-speed press by Siempelkamp. According to our knowledge there are no other presses that operate at such high speeds. The system runs steadily and safely at speeds between 1,850 and 2,000 mm/second. However, just as with a sports car, we are not always running the system to the limit. We have found an optimum speed around 1,850 mm/second – this, of course, happens only with a well trained team.

The plant was designed for a nominal capacity of 450 m<sup>3</sup> per day at 1.8 and 18 mm. How many cubic meters of board are you achieving with the plant today?

Today we are achieving a capacity approx. 40% higher than the guaranteed performance. This is due to the higher speeds

at which we manufacture our products today. Furthermore, we have made a few investments in the entire line including optimizing the fiber separator or installing a fourth diagonal saw, to name only a few.

This plant is a predecessor to today's Generation 8. This means the board thickness tolerances are low which equals little material removal and low resin consumption, correct?

The thickness tolerances of our produced boards are optimal which leads to optimized use of wood and resin. In that respect our MDF plant has already been operating economically. Then, Siempelkamp approached us with a new product, the Ecoresinator, which is guaranteed to save 10 to 15% resin.

You were the first MDF manufacturer to install the Ecoresinator. What was the reason for this decision?

These days, the promise to save resin is like winning the lottery. Our costs for resin and wood are growing but the proceeds from our products cannot be increased indefinitely. After our long cooperation with Siempelkamp, we have developed trust in this supplier. We have even waited until the Ecoresinator was finished developed before we made the decision for another product.

How complex was the installation and how long was the plant down?

The Ecoresinator was supplied as a completely wired assembly group including a switchgear cabinet. The mechanical and electrical installation including software took one day; the start-up and optimizing phase another day. This means the system was operational after only one cleaning shift.





Ecoresinator at Starwood, Turkey

#### Were there any start-up problems?

We had no problems. After various parameter adjustments and tests, we could resume normal production without any start-up losses.

#### How high would you estimate the additional operating expenses for the Ecoresinator?

There are practically no additional operating expenses! We need approx. 75 kg of additional steam per metric ton of fibers – and this is it. We need no vast amounts of circulating air, no additional power, and no additional cleaning shifts. The Ecoresinator was simply attached to our existing blowline blending system – that is all. The concept has totally convinced us!

#### How much resin do you save?

The savings in resin depend on the type of wood used, the board thickness and density. Since we are operating a system for the production of thin boards, our savings are especially large and amount at best to 24%. On average we are able to save almost 15% for all thicknesses (2.7 to 12.0 mm) and densities! We will have to check the conditions during the winter months again but we believe, after three months of operation, that these savings will be consistent.

#### What is the quality of the boards? Did you have any issues with resin spots?

Even with the old blowline blending system we had no problems with resin spots. Due to the very fine and intensive distribution of resin droplets, we achieve an excellent surface quality. We no longer experience any streaks or dark spots, the surface is simply more homogenous. Furthermore, we were able to increase the capacity by 5% which is attributed to another increase in the production speed and less waste material.

#### Have other international manufacturers approached you about the Ecoresinator?

At Ligna different manufacturers approached us and inquired about our experiences with the Ecoresinator. One Chinese wood-based panel manufacturer visited our plant to get an impression. The bottom line is that we believe the concept of the Ecoresinator is well thought out: minimal investment, quick installation time and low operational costs contrast with low resin consumption, better surface quality and capacity gains.

Entrepreneur of the third generation:

# Interview with Dr. Dieter Siempelkamp

For 53 years Dr. rer. nat. h. c. (German doctoral degree granted for the sake of the honor = honoris causa) Dieter Siempelkamp's vita has been linked to the company Siempelkamp. He gathered first experiences in industrial production and in the plywood press department. In 1970 he took over the direction of the machine works from his father's hands. As "entrepreneur of the third generation" he developed above all markets in Asia and North America. After his retirement from management in 2003 you can still meet him in his office at the Krefeld location operating as chairman of the advisory board. For Bulletin he has outlined his fascinating career.

By Dr. Silke Hahn



**When did you meet the company Siempelkamp for the first time?**

This meeting dates back approximately 74 years. Already at the age of four I was allowed to accompany my father to his working place every Saturday. I was truly fascinated by the company-owned locomotive and the impressive machining equipment. My father already explained to me at that time: "We build the best presses available." Thus I early learned about conviction and passion for our products.

**Which aspects of the career of your father Eugen Siempelkamp were family matters?**

The company formed part of the family and vice versa. We especially shared my father's business trips that had a different meaning at that time compared to the situation of today. When my father in the thirties for instance went on a business trip to a customer in the United States, it was really a matter of expedition. Today you can fly within a few days, but at that time such a trip came along with his absence for weeks, since it meant traveling by ship.

These travel activities were always shared with eagerness through our family. They really were more important than today because the need for business trips is often obviated due to modern communication channels and technologies. Also the potential of information that is managed today through recent professional magazines and electronic media was not available at that time. Business meetings and personal contacts have always been the basics for a good business relationship – formerly they were absolutely indispensable as the only way to take a direct line to the customer.



Dieter Siempelkamp (left next to the apprenticeship manager at a meeting of apprentices in 1953)

Dieter Siempelkamp with the maharaja of Gwalior in 1960



Wedding invitation



**What was your first task upon joining the company in 1958?**

My father was committed to learning by doing: "Look how I do it, then do it on your own." In 1958 our company enjoyed a boom – at that time we were all committed to keep delivery schedules and to match the organization of the design department accordingly.

This was my first activity before I could dedicate myself to my core business: markets and business trips to our customers. Siempelkamp had always been a very export-oriented company. The forest-rich Scandinavia offered high market potential, Spain, France, Portugal and Italy were also important markets. We especially developed and cared for our contacts to the Russian market – it was already at the beginning of the nineteenth century that my grandfather delivered to these regions. In addition to that there was a demand only in Germany of roundabout 300 customers inquiring our products.

Later on I was committed to the globalization of the company beyond European borders – a strategic issue that my father already pressed. In 1951 he traveled to Brazil and established the close contact to

the Setubal family who founded the Duratex Company still subsisting today. In the United States significant projects were waiting for us; due to the first plywood and chipboard presses milestones were set on our way into the market.

**Which contacts arose from Asia?**

In India for instance we delivered chipboard presses for the production of tea cases in the fifties. Our 4'x 8'-presses met with the requirements of these unusual sizes that such cases were provided with. We were particularly challenged through the bonding process, since it was not allowed to impair the tea flavor by the smell of bonding agent due to possible incorrect bonding techniques.

**Many experiences, many stages of your career. Which was the most important milestone reached with Siempelkamp?**

Several years before my retirement it was crucial to search and find the right successor for me. We succeeded in doing so. In May 2002 we introduced Dr.-Ing. Hans W. Fechner as my designated successor in the position of speaker of

management who should take over the responsibility together with Mr Szukala. In 2003 I finally retired from management. In this case we definitely made the right decision.

**The most interesting encounter?**

I gladly remember four persons. A great experience was the encounter in 1973 with Jimmy Carter who became President of the United States later on. On the occasion of the establishment of our overseas branch in Atlanta he invited our US general manager Ed Steck and me to a reception. As former governor of Georgia he appreciated the new overseas branch as a welcome enrichment of the economic profile of Atlanta. Carter met us in a very open-minded and friendly way!

A longer time ago I met another impressive gentleman. In the sixties I encountered the Maharajah of Gwalior in Bombay. This prince had forests with large resources of teaks. Our task was to inspect the tree population and to check potentials for a





Dieter Siempelkamp and Jimmy Carter in 1973

vener mill. We found precious trees – but unfortunately also “bullets”, since the forest served the purpose of hunting ground for tiger hunt. We recommended that the processing of these teaks should not be considered. Thus we did not make deal from the business point of view. However, in return for the honest expertise I received an invitation to the opulent wedding of the Maharajah's daughter that was celebrated in a palace in Bombay.

#### And the other two meetings ...

... I personally attended to with our customers. I was very impressed by Fritz Egger who laid the foundation in 1961 for the Fritz Egger GmbH & Co. OG operating the first chipboard plant in St. Johann, Austria. Today this company has been producing at 17 locations in Europe and has always been closely connected to Siempelkamp. We are proud of this customer relationship characterized by friendship and mutual confidence.

Olavo Setubal, the founder of the Duratex works in Brazil, was also amazing. This biggest South American maker of wood wood-based panels placed an order in

1951 to my father on his first fibreboard plant. Every time I called on him in São Paulo Setubal senior invited me for lunch. The topic was always the former visit that my father had made at that time and the purchase of this first plant!

#### The most innovative invention/development?

At first the caulless pressing of particle-board was developed at the end of the sixties / beginning of the seventies. Due to this process the solid metal plates used by competitors for transportation and pressing became redundant. Our first invention was the so-called Tray-Belt System. The chips were spread into a container that moved into the press. Upon return the belt was unwound and the spread mat stayed in the press. A very compact and additionally simple solution! We delivered many of these storage container lines to all customers located in Europe.

Later this first concept of caulless pressing resulted in a further development, the belt line. Particles were spread on belts conveying the mat into the loading cage. At that place there were moving tray belts. After loading with chip mats they were entered into the press and the finished boards were ejected at the same time into the unloading cage. During return of the belt trays the new chip mats were placed in the multi-daylight press. This procedure required an initial pressing so that we laid the foundation for the first continuous pre-presses. Owing to the belt conveyors it was possible that large capacities of 1,000 m<sup>3</sup> per day could be produced for the first time.

Another milestone of course is our Conti-Roll®, the reference product made by Siempelkamp. Continuously pressing meant an enormous technological leap. We enabled tolerances that competitors

could only dream of formerly. Where millimeters were ground in that period, today we work within a tolerance of a tenth of a millimeter. In addition to that all other benefits were achieved as to savings of raw material and glue as well as quality improvement.

#### What was different formerly, if you think of research and development?

Formerly new concepts were tried out on site and in cooperation with the customers. Company owners operating lines delivered by Siempelkamp had always been very open-minded and made their contribution to the marketability of the machines. For many years innovations have been now achieved in our own R&D.

It is always very important to emphasize that today we deliver wood-based panel lines that are completely realized through our own production – i.e., all machines are developed, designed and built in our own premises. The teamwork of our manufacturing sites in Germany, China, Czech Republic and Italy is essential for that success. The expertise for instance available in Krefeld for heavy-duty machines is optimally completed by the different competencies of our locations abroad.

Celebrating birthday with a drink from the left to the right: Willi Hoster, Gerhard Hütz, Eugen Siempelkamp, Dieter Siempelkamp, Friedrich Werner





Presentation of the first ContiRoll® press in 1985



Farewell speech as managing director in 2003

**The strength of a family-owned business consist of ...**

... the commitment to long-term planning and action. In groups management and strategies often show a shorter duration. Unbeatable properties are additionally short decision-making processes and high flexibility especially when markets are subject to changes. And family-owned companies are nearly all characterized by a deep solidarity with the company and its employees.

**The biggest challenge for a family-owned company consists of ...**

... to foster and to preserve at any time the readiness to cooperation and harmony between the shareholders. All family members have to be completely aware of the fact that the company's interest ranks first.

**Siempelkamp 1958 until today: the biggest and most important change?**

It is the change that we have triggered during the last years, supported by advisory board and family. We focused on – and still have been doing so – investments in our machinery to a large extent. As a result thereof we have equipment at our disposal that is unique in Germany. Our department for the machining of large

parts is that well equipped that elements with a weight amounting to max. 350 tons can be machined.

Important developments can also be discerned at other pillars of our company: foundry and nuclear technology. There is no larger hand-forming foundry than ours realizing casts with an individual weight of up to 300 tons max. These large elements are required for our large metal-forming presses, but also for other customers that have their casts realized through us. In the market there is no other company that can cast such heavy parts and subsequently deliver them in a finished condition.

Also the nuclear technology sets benchmarks in its market. In this field the name “Siempelkamp” is recognized for exemplary performances in safety technology that throughout the world has been in great demand growing faster than ever. The Core Catcher tested and invented in Krefeld is a central and internationally recognized component of safety concepts for nuclear power plants.

**If today you could start again in your company, what would be your preferred issue to be approached?**

Actually the same issues I started with: development of our markets, the close

contact to our customers. It's only the close relationship to our customers including the intensive personal discussions permitting to learn what the market will need in the future. This is crucial for our strategy and for our research and development as well. I would set other priorities as to the sustainable support of our education and further qualification. I have been always committed to this aim within the Eugen Siempelkamp foundation.

**Dr. Siempelkamp, thank you very much indeed for this exciting interview!**

Dr. Dieter Siempelkamp with Gerald Schweighofer on the occasion of the award ceremony of the Schweighofer Prize in June 2011



“Vítaný!”\*:

# New factory in Blatnice for another



**Four years after its formation Siempelkamp CZ s.r.o. is committed to expansion: On July 7, Dr.-Ing. Hans W. Fechner, Chairman of the Executive Board of Siempelkamp Maschinen- und Anlagenbau GmbH & Co. KG, already opened the second manufacturing site in Blatnice. In doing so the Czech Siempelkamp daughter is fully equipped to realize the assembly of a great number of components in its own factory.**

By Michal Pospisil

Upon inauguration of the manufacturing site in December 2008 Siempelkamp CZ s.r.o. started as small factory with 20 employees in January 2009. The crucial factor for the establishment of this new site in the Czech Republic was to become more independent from external sub-suppliers. “Create increased added value within the Siempelkamp group” was the message. The start-up portfolio includes a great variety of forming-line components starting from spreader to roller conveyors. Today a maximum manufacturing volume of about 170,000 working hours is possible on site.

Many high-quality sub-assemblies have been produced in the meantime in Blatnice. Including for instance de-stacking station, clamping station, scrap place, loading, packs forming table, pick-up carrier and bunker. More than 120 employees are on duty under the leadership of General Manager Michal Pospisil thus entailing an already six-fold increase of the number of employees compared to the initial team of 2009. Large orders as from Kalevala make a big dent here with a considerable manufacturing percentage – the Russian customer ordered a complete OSB line including 9’-ContiRoll®.



# increase in productivity

For this order the Czech Siempelkamp daughter nearly manufactures 100 sub-assemblies. On the one hand for the forming line that was produced in May/June. On the other hand the cooling and de-stacking stations are manufactured on site. The space required for the assembly of that order was now provided by means of two additional workshops.

## Blessings and salute

The inauguration ceremony united Czech tradition and a proper effect: Traditionally, the local priest blessed the new assembly shop. By a salute from an old cannon Dr.-Ing. Hans W. Fechner then inaugurated the new workshop. Together with the Blatnice team a Siempelkamp delegation from the company's headquarters in Krefeld, Germany celebrated this day.

Also local VIPs – mayor Vladimir Hanak and adjacent company owners – attended to the solemn inauguration ceremony. In particular Vladimir Hanak highly values that owing to the new Siempelkamp location new jobs have been provided in Blatnice. Since the region is one of those in the Czech Republic with the

highest unemployment rate, the new job opportunities are vitally important.

A convenient side-effect of the Siempelkamp commitment in Blatnice is also local sponsoring, mayor Vladimir Hanak pointed out on the occasion of the inauguration of the new workshop: Siempelkamp already provided 6.000 euros totally for sports facilities, nursery schools and other charitable purposes.

## Site extension in Blatnice: Always one step ahead

In the meantime they have been already one step ahead in Blatnice. At full operation of the new site the number of employees will be increased to 128 by the end of 2011. Support teams from Krefeld are continuously on duty on site to improve process efficiency and to make the crew fit for the new tasks that become more and more challenging. Productivity of this factory significantly increased due to the site extension – and also the motivation of the Czech team ready to give its very best to the Siempelkamp standards!



## Benefits made in Blatnice

- More independence through self-construction
- Site benefits from location close to Austrian border
- Easily accessible due to the favorable location of Blatnice directly connected to the freeway networks
- Increased manufacturing volume
- Very good quality
- Good qualification and know-how of employees

# “Product quality and adherence to schedule – everything is alright!”

Interview with General Manager Michal Pospisil

In Blatnice General Manager Michal Pospisil manages the business activities of the Czech Siempelkamp daughter. In the interview with Bulletin he outlines how the team has struck the balance between growth and demand for quality in the past years.

Siempelkamp have been manufacturing for many years in Blatnice, the location is growing. How important is it for the employees to be integral part of this growth and last but not least to form part of the Siempelkamp Group?

Our employees generally appreciate the job security, the plenty of orders, above all the incredibly good order situation during the crisis, excellent working and of course remuneration conditions.

**Which careers are available on site?**

Our staff works at sandblasting machines, saws, drills, plasma-cutting machines, milling and turning machines as well as in sheet metal forming. But they also do welding, painting and assembling jobs.

In Blatnice more and more high-quality sub-assemblies are manufactured. How have Siempelkamp CZ s.r.o. developed since the very beginning?

Since the beginning of 2009 we have gone through a fast and extensive process. We started with the tables for forming lines and bulk materials; after five months we built the first big bunker. Very soon thereafter we realized nearly the whole forming line and later nearly the complete downstream part of the press. After two and a half years of manufacturing time we could say that we are now able to make high-quality sub-assemblies including electrics and pneumatics with numerous special features. We are manufacturing five to six large orders at the same time so that not only our range of products, but also the parallel handling of several orders

is steadily improving at a high level. Our staff members are very proud that the product quality is alright and till now we have been able to keep all our main deadlines!

**How qualified are your employees – and what kind of measures do you take on site to foster personal development or professional training of your team?**

Our team and also the new members of our staff have a good qualification and expertise as to their jobs. To familiarize new employees with Siempelkamp bills of materials and drawings we conceived of a special orientation program comprising also trainings. We regularly communicate for instance by means of feedback and assessment discussions so that our team



View of the new factory shops





has the chance of growing on the job and of steadily bettering themselves. I don't want to forget the colleagues in our offices: They are doing a very good job as to work scheduling, purchase, inventory, quality management and accounting. I should emphasize that we do have highly committed employees for all the important positions.

**Your employees and the support team from Krefeld work hand in hand to consequently implement the high Siempelkamp standard for all new tasks. What is the focus of this team-work?**

The support team has been a great help for us from the beginning; its know-how was indispensable particularly at the

beginning. Of special importance is the support for the handling of new complex sub-assemblies. We also very much appreciate the backup for production flow optimization. Additionally, the support team helps a lot with regard to sub-suppliers to ensure the Siempelkamp quality standard there as well. Extent and importance of the activities provided by the team are really great – and on that occasion I would like to sincerely thank all the parties involved.

**At present the Siempelkamp location again offers new job opportunities due to the planned extension of personnel. How attractive are these potentials in town and the region – and which job profiles will get a real boost soon?**

Our company of course has a very good reputation. This is advantageous for the search of new employees. We receive the tenfold of applications for our job advertisements than actually available in the company.

**What do you like most about your job?**

Basically, I enjoy my job. I am proud of our employees, when I see how they grow on the job if they get a chance. As to quality of our work and adherence to delivery periods our success is pleasing. It is striking how fast and successfully our young company has developed. Insofar I am happy to be a part of the Siempelkamp Group!





Saxon hydroelectric power checked:

# Siempelkamp gives the “green light” for pumped-storage power plants

By Dr. Andreas Thomas and Dr. Peter Seeliger

Niederwartha pumped-storage power plant



The accelerated phasing out of nuclear energy in Germany has been decided – a radical change with regard to power supply is the consequence. What will the energy mix of tomorrow be made up of? Pumped-storage power plants will play an important role here and breathe fresh life into the almost forgotten power source of “hydroelectric power”. Here, Siempelkamp demonstrates its testing and surveying expertise, as a glance at Saxony illustrates.

What the new energy mix will look like as of 2022 is still unknown at the moment. However, the fact is that enormous investments will have to be made in the period running up to this date, e.g. in grid expansion, in new fossil fuel power plants, in wind turbines, photovoltaic and biogas plants, in storage technology and, last but not least, in pumped-storage power plants. Furthermore, the power supply companies must also increasingly invest in the servicing of their current plants, as they will obviously be granted a longer service life.





Severe plate rust and shell deposits on pumped-storage power plant components: fastening element, guide roller and rivet connection of section and sheet

### Pumped-storage power plants: history – and a race against time between Saxony and Westphalia

- 27 November 1929: The first large-scale pumped-storage power plant to be realized in Niederwartha (Dresden) partially goes on the grid after three years of construction.
- January 1930: Full commissioning of the 132 MW Koepchenwerk pumped-storage power plant located in Herdecke an der Ruhr, Westphalia – as a result, two technical masterpieces are on the grid that were celebrated for their innovation and size.
- March 1930: Final completion and complete commissioning of the Niederwartha pumped-storage power plant with six hydroelectric generating sets and a total output of 120 MW
- Following the Second World War: Dismantling of the Niederwartha pumped-storage power plant as a reparation payment to the Soviet Union.
- 1960: Gradual reconstruction of all six turbines, each with 20 MW
- 2002: Setback in Dresden caused by flooding of the River Elbe – today, only two of the turbines at Niederwartha are in use as a result of the damages
- The operator is currently planning the installation of larger turbines of up to 120 MW – a new future for the power plant!

This is where Siempelkamp Prüf- und Gutachter-Gesellschaft comes into play: its service focus is directed towards the condition analysis during overhauls / plant inspections – as well as towards the measures to be derived concerning the preventative repair and monitoring of power plant components that determine the overall plant's service life. The Siempelkamp subsidiary has already successfully demonstrated its expertise in Germany's oldest pumped-storage power plant.

### Energy generation from hydroelectric power: an almost forgotten power source rediscovered

In Germany, hydroelectric power is an almost forgotten power source – however, pumped-storage power plants are doing a great job here: to date, these energy suppliers represent the sole technology ready for the market that can store a surplus of power – from renewable energies, for instance.

The trick: Excess power is used to pump large amounts of water from a lower reservoir to a higher reservoir via large pressure pipelines. As soon as the demand for power increases, the water located in the higher reservoir is allowed to flow down into the valley. In doing so, the water drives a turbine that is coupled to a generator. Currently, over 30 pumped-storage power plants bunker 40 GWh of power in Germany – as much as the whole country consumes within a period of only 35 minutes.

Germany's largest pumped-storage power plants, each with an output of 1,000 MW, are located in Goldisthal, Thuringia and in Markersbach, Saxony. Following the change in energy policy, the



demand for storage capacity will be many times that of the current output, meaning that the search is on for further alternatives. New constructions of pumped-storage power plants are difficult to implement in Germany. Obstacles include a lack of possible locations, high investment costs and citizen's protests.

However, there are currently plans for Atdorf in Hotzenwald (1,400 MW), Riedl in Bavaria as well as locations in Trier, Ulm and Forbach. The construction of the world's first underground pumped-storage power plant at the Auguste Victoria colliery is planned to be completed by the end of 2015. In this respect, a renaissance is in the offing for the pumped-storage power plant that may include the strengthening of the existing plant technology or the expansion of the turbine output. This for example is illustrated by Germany's oldest pumped-storage power plant in Niederwartha, located on the outskirts of Dresden (see box).

**Hydraulic engineering structures & turbine technology made in Saxony: the Siempelkamp check**

The characteristic of a pumped-storage power plant is the reversible plant operation. A Francis or Pelton turbine, a motor generator set and a pump are mounted on to a shaft and form a unit that permits two modes of operation.

When power is needed, the motor generator set is driven via the turbine, works as a generator and supplies electricity. In the event of a surplus in power, the motor generator set works as an electric motor and drives a pump that pumps the water back into the upper reservoir. Pressure surges are created when closing the shut-off valve in the pressure pipelines or in the event of switching between the two modes of operation. If the flow rate is changed, high acceleration and braking forces occur in the pressure pipelines. The so-called surge tank, a high-volume reservoir that is open on the top, subdues the effect of these shocks by collecting and diverting the quickly flowing water. Inside, the water level can change freely in order to provide pressure compensation. The Niederwartha pumped-storage power plant has three of these surge tanks.

Here, there are three penstock pipelines with 3,500 DN (Diameter Nominal) located above ground, tapered to 2,500 DN with level and steep part. In total, the pressure pipelines measure 1.9 km in length, the head of water amounts to 143 m. The four outer turbines including the associated penstock pipelines are currently decommissioned. The central machines that are supplied from the central pressure pipeline are in operation.



Valley-side pipelines on the Niederwartha pumped-storage power plant



Pipeline supplies to the turbine house

Upper reservoir emptied for inspection





Inlet gate on upper reservoir

A dam has been constructed each on the higher and lower reservoirs in order to serve as retaining structure.

#### Plant inspection tasks

In 2005, SPG examined the condition of the penstock pipelines for the four outer turbines that had not been in operation since 2001. The comprehensive test program consisted of corrosion examinations, wall thickness measurements as well as crack, radiographic and hardness testing on the numerous assembly welding seams. Although the original coating system had been severely affected by underlying rust, both surface erosion as well as individual corrosion pitting only displayed low depths. The welding seam testing did not show any manufacturing or operating-related faults.

A similar examination program was planned for the central penstock pipeline and associated surge tank still in operation. The client determined five pipeline sections as areas of focus for the tests. Some pipe sections could only be accessed with the aid of fall protection devices due to the steep incline of 30° to the mountain.

The job included services such as the inspection of the penstock pipeline, participation during the determination of defined testing areas, grinding works on test sections, test execution as well as the evaluation of the results and subsequent condition assessment. In addition to this, the inlet gate\* belonging to this pipeline on the upper reservoir was to be tested. For this purpose,

\* In the field of hydraulic engineering, inlet gate describes a device used to control the water flow of pipelines / for blocking and retaining of waterways or locks. Larger systems of this kind are referred to as "weirs".





Upper course of the inlet gate



Tests on the welding seams of the penstock pipelines

the upper reservoir was made “dry” for six weeks in order to ensure that the steel structure and its mounting were accessible.

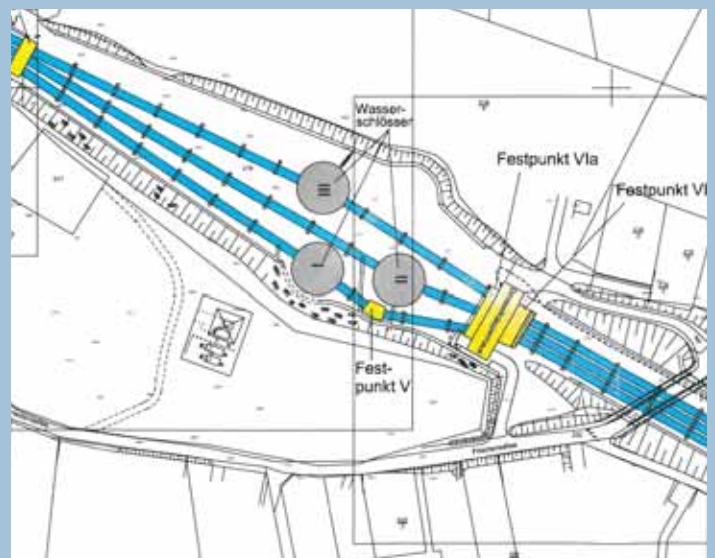
Visual findings were a part of the job that the Siempelkamp testing and surveying team addressed. Furthermore, the task was to investigate the material condition and various material characteristic values such as the chemical composition and mechanical strength on sections, sheeting, bolts and rivets. In the lower part of the lock, the sections and mountings displayed severe plate rust due to the decade-long contact with water.

The main focus of the inspection was the central pressure pipeline used for operation, the associated surge tank as well as pipeline sections at the turbine house. Here, the condition of the

longitudinal and circumferential welding seams was put through its paces by means of ultrasonic, magnetic powder and radiographic tests as well as hardness testing and metallography.

The non-destructive tests displayed no indications that are subject to registration. However, individual repairs are indeed required: given appropriate operation, we were able to give the operator the “green light” for the further operation of their penstock pipeline. The customer was thoroughly satisfied – and we were able to demonstrate once again our expertise and performance in the field of plant inspection.

Map sections with pipeline route and the associated structures





Rollin', Flowin', Swimmin':

# How Reintjes put its marine gearbox assembly on RoundTrack®

By Martin Stahlberg



What do Vibrant Curiosity, Martha Ann, and Mad Summer have in common? They all have gearboxes from Reintjes at their hearts. But these yachts are not alone. A global player in its field, Reintjes equips ships of all sizes. A period of strong growth prompted the German manufacturer to consider a general overhaul of their facilities. A new plant structure was to be implemented to ensure greater capacities for the growing business, optimize the material flow, and streamline processes. With support from lean management consulting firm STAUFEN AG, the pilot facility was put into operation within six months, including a new assembly organization conceptualized from scratch. Reintjes implemented one-piece-flow assembly: the gearboxes are moved from workplace to workplace on RoundTrack® from Strothmann. The restructuring resulted in a 15 percent rise in productivity and a throughput time cut in half.

In the past decade, maritime traffic, and container transport in particular, has seen considerable growth. In this short time span, Reintjes' gross sales almost tripled up until the record year 2008, assisted by several million Euros worth of investments in machines and manufacturing facilities. Christian Coninx, Production Manager at Reintjes, recalls: "Although we ran three shifts, our customers had to accept lead times of more than one year for some gearbox models." Though sales did not suffer despite these circumstances, the manufacturer sought relief. A new production site was to be set up in line with material flow and process optimization principles. "We were working to capacity. We could not draw up a concept ourselves. Out of the four consulting companies we considered, STAUFEN AG's practical and resource-friendly approach was the most convincing," says Coninx. That winning strategy allowed for parts of production and order fulfillment to be redesigned according to lean aspects instead of spending much money on constructing new buildings.

#### Production flow as a prerequisite for lean processes

So-called "small" gearboxes from Reintjes have a performance range from 250 to 1,600 kW. Their application areas include everything from fishing vessels to river cruise vessels. The restructuring project's

goal was an optimal organization of the assembly line for these gearboxes. To make the employees aware of which processes add value to the product and which do not, STAUFEN AG consultants first held a basic Lean training – another aspect that convinced Coninx and his colleagues that they had made the right choice. Considering the entire process chain – from the receipt of an order to shipping the completed product – helped them minimize unproductive ancillary activities such as intralogistics and organize the remaining processes as effectively as possible. The employees also became familiar with key concepts such as Lean Administration, Lean Development, Lean Logistics, and Lean Factory. They got to know the fundamentals of streamlining direct and indirect business activities in accordance to the Toyota production

system which STAUFEN AG's approach was modeled on. "Systematic implementation of lean management across the entire value chain enables companies to gain a competitive advantage," says Thomas Schlösser, Senior Manager at STAUFEN AG and an expert on added value systems and process-oriented factory structures.

#### Design your own workplace

For an efficient organization of assembly work, staff qualification and inclusion of their know-how and ideas are crucial. Schlösser describes his approach, "We want to give our customers the knowledge and the tools to continuously improve in-house processes by themselves". Following a survey of the status quo in the plant, he chaired the formulation of a concept for

## Company background STAUFEN AG

STAUFEN AG, a consulting company with international customers, is one of the leading lean consultancies in Germany. As a "partner on the way to top performance," its goal is to effect sustainable value chain optimizations in the short term. The company offers support for implementing a lean management culture, a lean management system, and for the establishment of an individual improvement structure. Furthermore, the consultants custom-tailor crisis solution concepts: as turnaround or interim managers they can raise revenue and efficiency of select departments or realize a company-wide restructuring. First-rate references in all key industries include renowned companies, middle-sized businesses, and corporations such as MAN, Voith, or SEW-Eurodrive. 100 employees at the headquarters in Germany and in subsidiaries in Switzerland, Italy, Poland, and China provide services locally: consultancy, support with the implementation of the concepts, and employee qualification.

Strothmann lift trolleys in the assembly line



the first new assembly line. Once Coninx and his team had prepared a draft, Schlösser invited the group to construct all required workplaces from cardboard. While the suggestion surprised Coninx, STAUFEN AG's record of good experiences with this procedure quickly convinced him to proceed with the mock workplace construction. Unfortunately, at this stage of the retrofit project, demand for marine gearboxes plummeted with the entire industry sector, and indeed the global economy as a whole. The crisis of 2009 had arrived. Should the project be continued? "If not now, when else," the people at Reintjes agreed. Coninx reflects,

"Suddenly, we had plenty of time available for this project, and Thomas Schlösser had put us on the right track". A mixed team of experienced employees and young colleagues eager to experiment set out to design their own future workplaces.

#### One-piece-flow assembly

Studies and reports show flow assembly to be the most efficient way to organize most assembly lines. However, what still surprises many people is that it is indeed a feasible option for large products with long cycle times and variances as well. Up until that time, Reintjes had opted for box

assembly: a gearbox was completed at one workplace, and the workers as well as all tools and materials had to come there. Now, an assembly line should be implemented – doubts arose whether this could be done in an efficient way. For the time being, Schlösser left the question of how the gearboxes would be transported out of the discussion: the team was to fully concentrate on the optimum arrangement of all necessary work steps. Without preset ideas, Coninx and his team defined the workplaces and decided which tasks to include and which stations to combine. They decided, for instance, to integrate wiring which before had been done centrally. The existent test stand was not moved but assigned to the assembly line and integrated into the work cycle. However, the necessary space was reserved at the end of the line; therefore, a test stand can easily be set up there whenever it is convenient. In the new assembly line, the workpieces are completed as they pass through the workplaces (one-piece-flow). Various concepts for assigning individual work steps or the entire assembly process to particular workers can be applied. Accordingly, employees had to be qualified for a variety of work steps. One-piece-flow assembly ensures high quality, benefits productivity, and makes the production process as a whole more transparent. Problems are clearly exposed and can be solved right at their source. Furthermore, throughput times per piece are reduced and less material must be kept in stock.

## Ergonomic mobile workplaces: everything between manually operated and precision-controlled

The RoundTrack® floor rail system gives users major benefits such as a low noise level, low maintenance, high availability, and high efficiency. Moreover, since it does not require conductor rails or trailing cables, it also increases workplace safety and reliability of the power supply. Protruding only a few millimeters from the hall floor, the round, easy-to-clean tracks form no barrier for people or other vehicles. Strothmann offers not only standard trolleys for various load ranges from one to ten tons, but is also an expert in custom-tailoring trolleys which carry overload or outsized transport goods. Due to the minimum rolling resistance, loads can be moved manually in many applications. For cases where this is impractical or not asked for, either because of too heavy loads or due to health concerns, for example in paint shops, a choice of fast, comfortable, and precise electrical drive solutions is available. Strothmann offers battery-powered transport cassettes with high-performance batteries, which can be recharged in stationary phases. They ensure safe and reliable transport and are used for very heavy and large parts such as crane girders or vertical stabilizers for planes, for example. In applications requiring high energy capacities or maximum availability, for reasons such as short cycle times, power can be supplied by means of cable reels, energy guiding chains, or bus bars. An inductive power supply to the trolleys is the best choice for long distances and high speeds.



## Company background Reintjes

### Let's roll – the project gets going

A small Reintjes gearbox weighs between 300 and 2,300 kilograms. When the various assembly stations were organized in a line and the cycle time was scheduled, an efficient solution for transporting the gearboxes from station to station was needed. "We had used conventional rails in another production site," says Coninx. "This time we were looking for new, better solutions. When STAUFEN AG introduced Strothmann to us, I realized immediately: the RoundTrack® does away with the major disadvantage of conventional rails – it is no impediment for other vehicles or people, since the tracks vanish in the hall floor". Ships are equipped with light gearboxes in order to reduce the load, which benefits the agility of the entire craft. Strothmann, too, designed the RoundTrack® floor rail system with agility in mind: the goal is to make transport easy. Moreover, Schlösser knew that RoundTrack® technology is suitable for all industrial requirements. "We have recommended RoundTrack® technology to several STAUFEN AG customers. For Reintjes, it is particularly suitable because the tracks are easy to mount, and with the special trolleys, the gearboxes can easily be moved manually without power supply."

### Energy efficiency at sea and on tracks

Light weight and smooth running – two features of Reintjes gearboxes for small, fast vessels – are also characteristic for Strothmann trolleys. After all, every extra gram increases the energy required for transport. Reduction of rolling friction helps saving energy, too. The RoundTrack® floor rail system combines round rails made from hardened and polished steel and ball bearing rollers, whose profile resembling a gothic arch ensures that contact with the rails is limited to two

Reintjes GmbH, one of the leading manufacturers of marine gearboxes, has been active in this field for more than 80 years. The company was founded in 1879. Reintjes supplies gearboxes for work boats, ferries, and yachts and other fast vessels. In addition to standard units, the performance portfolio also includes application-specific drive solutions. Since 2010, the company has also been working as a system provider of pod drives and hybrid technology for maritime applications. The manufacturer has continuously extended the performance range of its gearboxes, which currently cover 250 to 30,000 kW. Reintjes has a state-of-the-art research and development department including test stands. Thanks to a worldwide sales and service network of subsidiaries and representations, the company is present on all important international markets. Pursuing a close-to-customer strategy, Reintjes systematically broadens its position in the global market.

small surface areas. This patented technology ensures excellent wear resistance while at the same time minimizing rolling friction. For flow assembly of the marine gearboxes, Strothmann constructed special lift trolleys for 3,000 kg payload that can easily be moved manually even when loaded. The trolleys have been designed as mobile, ergonomic workplaces which carry the workpieces through the entire assembly process. They feature locking devices for fixing them in position. Once they reach the end of the assembly line, they are picked up by a forklift, transported back to the beginning of the line, and put back on track.

### Conclusion

This project, a milestone for Reintjes, will have a profound impact on the future potential of the plant. It showed how three diverse teams collaborated to produce a very fruitful outcome: the Reintjes employees' many years of experience, the STAUFEN AG consultants' commitment to applying new methods, and the right technology from Strothmann all contributed to implementing flow assembly. Productivity as well as flexibility has been increased, and an additional effect was that the employees have become true shareholders who take exceptional pride in their self-designed workplace.



End of the assembly line, the trolleys are picked up by a forklift and transported back to the beginning

Siempelkamp supplies crane technology for vocational school:

# The crane is off to school!

Siempelkamp Krantechnik is just as dedicated to thoroughly exotic jobs as to the more classic industrial applications. As a result, SKT for example has already developed a special crane that is used as an "orchid transporter" in a greenhouse. The company received a further pleasant special job outside of its core business for the supply of a training crane system for the "Berufsbildende Schule II" vocational school in Leer. As a company with a long-standing tradition for taking on trainees, we are particularly delighted that our crane is going to school!

By Ute de Vries

Moormerland, where Siempelkamp Krantechnik is located, belongs to the rural district of Leer (East Frisia). The "Berufsbildende Schule II" vocational school, abbreviated in German to BBS II, is also based here. It offers vocational training in all major technical jobs and is currently attended by 2,500 students. The training content offered by the school ranges from the "career entry school" for young people without school-leaving qualifications through to the "technical secondary school" that awards the general higher education entrance qualification.

The vocational field of metal engineering is the domain of approx. 500 students and approx. 30 teachers. Amongst the "metal students," the field of metal construction engineering comprising the vocational training occupations of metalworker

and construction technician makes up the largest group – and it is here that SKT comes into play.

In the sixth form, the selection, use and handling of hoists and fastening devices is part of the framework curriculum of the metalworkers and construction technicians. How are hoists and other metal construction engineering systems professionally maintained and serviced? How do I properly use the documentation such as operating instructions or maintenance and servicing regulations? The answers to these questions can be found at the "Berufsbildende Schule II" vocational school in Leer – as one of the main training objectives is the safe and accident-free use of hoists and fastening devices.

For the emerging talents, learning to use the object itself is an amazing and above all a sustainable matter – that is why the procurement of hoists for training purposes had been on the wish list of the responsible teaching staff for a long time. Ironically, it was the financial crisis that first helped the school to make their wishes a reality as it was the "Economic Recovery Plan II" established by the German Federal Government in reaction to the crisis that enabled the BBS II to finance their project and buy a crane system for the newly constructed building inside the BBS II called the "K II-Haus".

## Small in size, but great in performance

The crane system is a SKT special design that was created in close collaboration between the Siempelkamp team and the "Berufs-



The entire spectrum of loose load fastening devices in order to learn the expert application





Training crane system: Trainees learn the professional and safe fastening of loads and the operation of a crane system



“bildende Schule II” vocational school. Detailed ideas and wishes of the committed teaching staff were taken into account during the planning of the crane system. “The physical proximity to our premises offered the teachers and students the chance to come and visit us as a manufacturing company and to accompany their crane from the initial design right through to works acceptance. This was a great joint project for everyone involved,” says SKT Managing Director Heinrich Kampen.

To start with, the core of the entire system is a SKT standard product: a single girder bridge crane in rolled profile design with a load-bearing capacity of 1,600 kg, equipped with a monorail lower-boom trolley in short model design complete with electric cable hoist in 4/1 reeving. Special feature: at a span of only 4.50 m, various pieces of equipment had to be accommodated so that they are easily accessible for teaching purposes – as this plant is intended to also serve as illustrational material.

Pole-changing motors, control cabinet, frequency converter, limit switch for the pre-tripping and limit switching of travel movements of the crane and trolley, an overload fuse, load spectrum recorders, main current and control current supply to the trolley via cable trailing devices as well as the floor control panel for the

operation of the crane that can be moved independently of the trolley all form part of the equipment. In addition to this standard equipment, the bridge crane received a load measuring system complete with LED heavy-loads display that indicates the attached loads with a measuring accuracy of  $\pm 5\%$  – once again viewing par excellence for the emerging talents!

The bridge crane moves on a free-standing crane track located on supports. A construction-related special feature is the ability to easily disassemble and assemble the crane that enables the system to be deployed in other practical classrooms at the school at a later date.

The power supply alongside the crane track was executed in the form of a safety plastic-enclosed conductor line.

The SKT team constructed one support belonging to the crane track structure in a reinforced design so that a second crane model could be installed there: a wall-slewing crane with a 500 kg load-bearing capacity and a reach of 2.70 m, equipped with a manually moveable electric chain hoist. As a result, this type of hoist is also represented on the crane system in addition to the rope hoist.



SKT manufacture:  
Larger is our daily  
business



The slewing crane, a further component of the training crane system

Mechanical absorption of tensile forces (left)  
and briefing with regard to the professional  
operation of the plant (right)

Crane teaching plant: small in size,  
but great in performance





In order that the crane system can be used effectively in school lessons, BBS II ordered further accessories – e.g., the most diverse of loose load fastening devices such as fastening chains in 1, 2 or 4-strand design, fastening ropes, shackles\* or permanent magnets. In order to clearly illustrate to the trainees the rope and chain forces that occur on the load-fastening devices, mechanical load indicators complete the scope of delivery. And because a tidy house means a tidy mind, a storage rack for the various load-fastening devices is supplied as well. This rack was integrated into the crane track system so that all aids are tidy and clearly available for the lesson.

Last but not least, Siempelkamp Krantechnik supports the teaching staff with comprehensive documentation, training and teaching material. “As a company that takes on trainees, we are aware of the significance of such documents – there is no

\*A shackle is a U-shaped bracket that can be closed with a screw bolt or pin in order to connect two parts. Shackles serve to absorb tensile forces at the points of transition between ropes, wire ropes or chains and fixed components.

question that we are also happy to provide support here,” says Heinrich Kampen.

### Training supervisors at schools and in collaboration with companies – a sustainable concept!

Conclusion: For the “Berufsbildende Schule II” vocational school in Leer, the training of the students with the aid of the Siempelkamp crane system is an important component of their modern lesson concept that is formed by the idea of teaching as close as possible to the cutting edge of technological development. Special skills that future employers demand can only be anchored in this manner. For many years, Siempelkamp Krantechnik has been training young men and women as industrial mechanics, electricians for industrial engineering and engineering drafters themselves. “That is why we are exactly aware of the importance of ‘learning to learn,’ as a lifetime of learning is now more necessary than ever before due to the constant further development of modern technologies,” says Heinrich Kampen. The trainees in the rural district of Leer are prepared for a world that is changing ever faster with endeavour – and Siempelkamp Krantechnik is proud to make their contribution to this important topic.



Operation rules and notes for cranes



Synchronizing of the load-bearing capacity and the spread angle in accordance with the manufacturer's plate





Fully equipped training crane system: hoisting gear, limit switches, power supply, cable trailing device and control cabinet



Ceremonial handing over of the crane system by the rural district of Leer, represented by District Administrator Bernhard Bramlage (OZ image: Ammermann)

Bernhard Bramlage (right) pressing the button at the opening of the experimental house with the new crane system (OZ image: Ammermann)



New at the Krefeld location:

# Floor-type horizontal boring and milling machine PAMA Speedram 2000 – exactly precise!



A 150 t piece of a metal forming press during machining

If it's a question of high-precision machining of large and heavy components, the capability of boring machines has been unmatched. Boring machines meet better with the special requirements than large milling machines or vertical lathes. Since the beginning of July a new floor-type horizontal boring and milling machine has been fully operating– a new take on machining facilities on site!

By Manfred Biermann



Construction works at the foundations



For the machinery available at the Krefeld location Siempelkamp ordered a boring and milling machine made by PAMA, one of the leading makers of such equipment. Last but not least the decision in favor of a type of the Speedram series based on the variety of the possible applications. PAMA Speedram types are not only applied in the field of conventional machine building, but also prove their capability if components for energy systems, earth-moving equipment, diesel engines as well as of the aerospace industry need to be machined.

This corresponds to the variety of markets where Siempelkamp has been successfully positioned. The workpieces machined at the headquarters in Krefeld have been more and more used in very versatile sectors. In the Siempelkamp factories castings for numerous customers from very different industrial sectors take shape. Including for instance components for large Siempelkamp presses, but also structural parts of large wind power plants, housings for turbines and motor blocks for marine diesel engines. Finally machining has to keep pace with the versatile profile of the Siempelkamp casting expertise.

Another important crucial factor in favor of PAMA is the precision of the workpieces and the high-quality surface that can be achieved on such a boring and milling machine. Due to minimum manufacturing

tolerances the machine works with a precision of a few hundredths of millimeters. "The accuracy of the related drilled holes is up to 0.05 mm, the angularity 0.03 mm. Due to these very narrow tolerances we meet with our customer's requirements for maximum precision," states Roland Renkel, foreman of the machining department for large parts at Siempelkamp. Radio-controlled workpiece sensors have a part in the big picture to provide for precision in the machining process.

Exact workmanship is one of the core competencies, flexibility another. Here also the properties of the Speedram drilling machines are appreciated. The CMC-universally-controlled milling head is able to work at each angular degree to max. 360° and can be adjusted exactly to one single angular degree.

For the newcomer Siempelkamp prepared the ground in the truest sense of the word: Since 2008 a factory building has been enlarged in the range of the site development to be able to meet with the structural load requirements for the new big PAMA drilling and milling machine. Particularly the foundation had to be prepared in a way that the huge floor-plate stress of max. 25 tons per square meter would be possible. The load of the rotary table only is designed for 100 tons for extra-large castings.

### Boring and milling for aircraft turbines or wind power plants

The new boring and milling machine was challenged for the first time in July when the first component of a side-member press was machined. The chassis component maker had placed an order on the 50,000-KN press two years ago. With the component for this press the floor-plate of the PAMA machine was fully utilized.

Also in the range of an order placed by OAO Electrostal, the new machine already showed its capability. In September 2011

Machine operator in action







PAMA boring and  
milling machine



A press crossbeam  
under machining

## Many highlights for high machining competency

- High spindle speeds (up to 3,500 rpm)
- Rectangular thermo-symmetrical carrying sleeve with hydrostatic guides at all four sides
- Passage of carrying sleeve is automatically balanced via two inner tie rods considering the carrying sleeve position and the accessory weight
- Barycenter point shift of spindle box is automatically balanced
- Inclination of the column is balanced through the hydrostatic guides of the column slide
- Possible thermal expansion of spindle or carrying sleeve is automatically balanced (patented by PAMA)
- Oil flows around the spindle bearings provided with minimum quantity lubrication so that they are kept in a thermal balance by means of an oil cooler

the Russian company placed an order with Siempelkamp on a closed-die forging press with a pressing force of 20,000 t permitting the production of nickel-based super-alloys.

By means of the press Electrostal will make among others highly creep-resistant forgings with dimensions of up to 1,200 mm of length, 800 mm of width with a weight of up to 800 kg. The parts are subject to increased thermal loads and are applied in aircraft turbines or power plants.

In the range of this order the new boring and milling machine proves to be a strong and precise allrounder: Several parts of different sizes can be machined on PAMA Speedram. Currently, a cylinder housing as absolute king-size workpiece is under progress with a gross weight of 225 t. After machining the finished part will



## PAMA Speedram 2000 – design parameters

### Working range:

• Horizontal travel of column	X-axis	10,000 mm
• Vertical travel of spindle box	Y-axis	5,000 mm
• Axial travel of carrying sleeve	Z-axis	1,200 mm
• Axial travel of boring spindle	W-axis	1,000 mm

### Axis drives:

• Feed range (X)	0.5 – 20,000 mm/min
• Feed rate (Y)	0.5 – 15,000 mm/min
• Feed rate (Z)	0.5 – 20,000 mm/min
• Feed rate (W)	0.5 – 20,000 mm/min

### Spindle:

• Cross section of carrying sleeve	400 x 440 mm
• Boring spindle diameter	160 mm
• Speed range (3-step gear)	4 – 3,500 rpm
• Max. spindle capacity (SI)	60 kw
• Max. torque at spindle (SI)	5,056 Nm
• Boring spindle inner taper	ISO 50, DIN 69871-AD with planar support BIG-Plus

weigh 196 t – nearly 30 tons of “finishing” thus have to be realized, which is the equivalent of a huge cutting performance.

Another current workpiece will be applied in the field of wind energy: The new boring and milling machine is at present working on a machine housing for a wind power plant. Also in this industrial sector castings are subject to special requirements and PAMA Speedram contributes its share to meet with them. The finished machine housing will weigh 50.6 t (50,600 kg).

For the complex tasks that are pending at present and in the future for the new boring and milling machine the team has been also prepared: the Siempelkamp team starts with exactly the same precision as the new equipment due to basic and complementary trainings.

Milling of a cylinder component





Lower crossbeam



50.000-KN side member draw press for KLT:

# India fares well with Siempelkamp

In October 2011 the assembly of a side member draw press made by Siempelkamp started in Chennai. KLT Automotive & Tubular Products Ltd. had placed the order on the 50.000-KN press two years ago. In doing so one of the leading makers of chassis components decided in favor of a plant from Krefeld.

By Costa Kluge

Makers of commercial vehicles in emerging economies as Asia, Eastern Europe and South America are challenged twice. On the one hand they have to offer trucks and buses that are adapted to local conditions and requirements – as to road conditions and different transportation jobs. On the other hand it is essential to offer state-of-the-art technologies at attractive conditions.

That's exactly how life proceeds in the Indian markets. "Strive to produce quality products at a competitive price for customers," KLT states very concisely with its mission. The company is deemed

to be the "best in class"-maker for chassis / automotive frames and components in India. With 16 plants and more than 2,500 employees the automotive supplier is something of an institution at the local market. The new Indian truck brand "BharatBenz" (see box) is equipped among others by KLT products. Through the delivery of the side member draw press Siempelkamp know-how is used.

Indeed in the truest sense of the word: Side members are important elements of a vehicle that do not only positively influence the crash behavior. They also and even provide for safety and



## “BharatBenz”: new Daimler brand for India

**With an own truck brand Daimler will break into the new market steadily growing in India. From 2012 the specially developed trucks named “BharatBenz” (= “IndiaBenz”) shall roll off the assembly line in Oragadam near Chennai.**

Over 700 million euros are invested in India through the world’s number-one truck maker by his own account. “With our new truck brand we are sending a clear message: Daimler is at home in India. Our BharatBenz trucks are an appropriate mixture of Daimler-DNA and Indian market expertise. They are designed and built in India for Indians by means of Indian experts,” comments Dr. Dieter Zetsche, CEO of Daimler AG.

The new brand will include trucks of the weight classes from 6 to 49 t and solutions for different applications.

“India has been expanding for many years with macroeconomic growth forecasts of 7% to 8% thus offering an enormous potential also for the next ten years,” explains the head of Daimler truck division Andreas Renschler. “We assume that the Indian truck industry will double its volume until 2020. We will play a significant role in this development process.”

rigidity, if commercial vehicles are subject to high stresses due to their truckload. The combination of “special road conditions” plus “high cargo-carrying capacity” are particularly challenging for trucks or buses and their related equipment.

KLT placed the order on the 50,000-KN side member draw press in October 2009. Included in the scope of supply are punching and forming tools for varied side member executions, a charging and discharging device, roller conveyors for material entry and exit as well as a tool turning device. As to the basic structure the press is thus related to previous deliveries (see page 50). “Brand new however are the control and automation provided for this side member draw press. It is equipped with innovative electronics and hydraulics thus increasing the market appeal of this plant,” Samiron Mondal, Sales Director Metal Forming for Siempelkamp, explains.

In addition to the pressing force of 50,000 KN the new press features the following parameters: The ram plate measures 13.000 x 1.300 mm, the clearance between uprights in loading direction is up to 2.300 mm. The stroke of ram is dimensioned to 800 mm. The table height is up to 700 mm. Construction height of the press above floor amounts to approx. 8,300 mm.

Not only the dimensions, but also the weights are striking indeed. The heaviest element of the side member draw press is the lower crossbeam with 100 t, the upper crossbeam with 85 t and the moving crosshead with 80 t. For such heavy weights Siempelkamp is deemed to be the specialist!



Lower crossbeam of the press in the welding shop



Moving crossbeam as welded construction





Upper crossbeam



Lower beam during machining



## Moving crossbeam under machining



### Side member draw presses for truck chassis: provided with high compressive force and high capability

Siempelkamp make side member draw presses – a draw press type as for cold forming machinery – including complete material handling systems consisting of stack storage, sheet destacking device, infeed roller conveyors, camera-assisted hole counting system, crosswise material transport, straightening equipment and turning device.

The market for this product is permanently on the move: “Due to the growing demand for trucks and of course competitors, too, makers are forced to extend their production sites or to establish new factories,” states Samiron Mondal. “It is crucial for the right plant concept which lot sizes are intended through the plant owner. For medium and large lot sizes today the cold-forming process is nearly exclusively applied for economic reasons. For this purpose draw presses with high compressive forces and large

table dimensions are required. For smaller lot sizes, however, other presses are appropriate. For such applications Siempelkamp already developed special side member draw presses quite some time ago whose universality and efficiency justify their use also for smaller lot sizes from the technical and commercial point of view.”

The standard benefits of a Siempelkamp side member draw press are among others the excellent parallel ram control at high eccentric load, outstanding damping properties during punching operation, longer tool service life and last but not least increased productivity.

The current scope of supply is exactly matched to the new truck brand and corresponds to the Daimler concept. The plant will be set up in Chennai within the new factory premises of Daimler India Commercial Vehicles (DICV); full capacity will probably be achieved in May 2012.

## Truck side members: Punch first, then form

**In the first step** a blank stack is placed on the table. As starting material for cold-formed side members mostly sheets of a thickness of 3 to 12 mm and a tensile strength of 360 to 800 N/mm<sup>2</sup> are applied.

Magnetic lifting devices take the blanks off the stack and place them on a roller conveyor. From this place they are transferred to the press: in one working sequence contour and holes are punched through the punching tool. Subsequently, the punched sheets are moved out of the press, turned in pairs by means of a turning device and thereafter arranged to one stack.

**In step number two** the forming process is added: the finished sheet stacks are placed on the table – and are again transferred to the press where the bending and forming tool is arranged by means of which sheets are formed to side members.

After the press the side members are passed through a fully automatic aligning device. Here a laser-measuring device is applied checking the straightness of the side members; if required, they are subsequently re-straightened. Finally the side members are stacked in pallets and moved out of the plant.

## Main cylinders

Side-member draw presses for Indian commercial vehicles:

# On the road since 1994

Among the leading Indian makers of commercial vehicles Siempelkamp has been enjoying a good reputation for decades. One highlight: in 1994 even two big players of the Indian market placed an order on a 50,000-KN side member draw press including complete handling systems made by Siempelkamp.

Ashok Leyland and Tata Telco virtually placed orders on identical equipment. The scope of supply consisted of a 50,000-KN side member draw press as well as a fully automated charging and discharging system. A tool-changing device and turning device for tool change was also included in the scope of supply.

In the beginning the press was used by Ashok Leyland to manufacture truck side members for truck production according to Iveco technology. Today Ashok Leyland launches its own types. Tata Telco disposes of its own vehicle types, however started the production of Mercedes trucks in the fifties (see box).

The decision made by both companies is based on the good reputation Siempelkamp already had years ago in the field of commercial vehicle production. In the seventies word got around about a project realized by Siempelkamp in cooperation with Volvo. This hype could not remain untold to Tata Motors Ltd. so that it also placed an order in Krefeld – even before the order placed in 1994 axle bracket and side member draw presses had been delivered by Siempelkamp to Tata Motors Ltd. With both 50,000-KN presses a new milestone was reached by the Krefeld-India connection!



## East meets West in the Indian market

Indian makers keep a tight rein on the Indian truck market. The majority of all heavy trucks emanates from the works of the market leader Tata Motors and the company Ashok Leyland located in Chennai, the second largest maker of trucks and buses of the country. East-West partnerships are part of the corporate strategy of both corporations.

### Tata Motors Limited (previously TELCO – Tata Engineering and Locomotive Company)

- Largest Indian automobile maker – fourth largest truck maker throughout the world, third largest bus maker throughout the world
- Established in 1945
- The fifties: production of Mercedes trucks
- 2005: strategic alliance with Fiat, joint venture with Fiat Group Automobiles in Ranjangaon, production of both Fiat and Tata vehicles
- Over 25,000 employees
- Vision: "To be best in the manner in which we operate, best in the products we deliver, and best in our value system and ethics."

### Ashok Leyland

- Publicly traded Indian maker of commercial vehicles
- Established in 1948 in Madras (Chennai) as Ashok Motors
- Assembly start of Austin vehicles
- In 1955 shareholding by Leyland, renaming to Ashok Leyland and beginning of commercial vehicle production
- 1987: Acquisition by the Indian Hinduya group and Iveco. Iveco trucks have been also forming part of the product range from this time on
- In 1993 certified according to ISO 9002 as first Indian automobile maker
- 2006: takeover of Iveco share through Hinduja
- Current range of products: trucks, buses, military vehicles



Main cylinder with bushing – in-house production



Heavy loads – heavysset fellow



Mr Sankaran DICV and Costa Kluge from Siempelkamp

Project "Megawind" on the upswing:

# Siempelkamp Foundry is awarded

**Siempelkamp Foundry is contributing towards the new means of energy conversion in a highly specialized industry. This has been noted across the industries. In 2010, IHK Mittlerer Niederrhein (the Chamber of Industry and Commerce of Middle Lower Rhine) awarded the Research and Innovation Prize to the company: they achieved first place for their new material for structural components of wind turbines.**

By Dr. Silke Hahn

The prize, which is awarded every three years, was presented to Siempelkamp for the development of a cast iron material specially customized for wind power. This development enables the construction of new and even bigger offshore wind turbines. These wind turbines, which are already today provided by Siempelkamp with ductile cast iron components and are so far mainly set up in the North Sea, are the champions of wind turbines.

The turbines have brought about particular challenges for the industry: the generators must be very resilient and the technology must be particularly rigid and reliable. "In addition, the foundations in the sea – i.e., the anchoring and base – must be significantly deeper and denser than onshore. An ideal wind generator combines greater stability with low weight," explains Stefan Mettler, Managing Director of Siempelkamp Giesserei GmbH.

## Greater stability, less weight

How is it possible to combine the greatest stability with the lowest possible weight? For years, materials experts at Siempelkamp Foundry have been dedicated to answering this question relative to wind turbines. The challenge lays at the upper end of the turbine – at the nacelle, the



Onshore wind turbines



# Research and Innovation Prize



Offshore wind turbines (photo: Areva Wind)



Assembly of an offshore wind turbine (photo: Areva Wind)



Peter Mikoleizik (left), Development Manager, and Stefan Mettler, Managing Director, with a model of a wind turbine, type M5000 by Areva Wind



Machine carrier and lower deck in the Areva Wind final assembly hall (photo: Areva Wind)

technical heart of the wind turbine. In the nacelle, the rotor hub is housed and the rotor blades are mounted. The generator is also housed in the nacelle (see figure on page 58): "The filigree construction of the turbines is deceptive. The nacelles alone weigh from 300 to 500 t, depending on the model of the turbine. The weight proportion of the cast components at a nacelle is approx. 30%. If we can reduce this weight, we can on the one hand reduce the costs of the cast component itself. On the other hand, due to the resultant lower costs, we can also reduce the costs of the foundations of the entire turbine," says Stefan Mettler.



Type plate on an Areva Wind cast component, indicating the cast material and Siempelkamp casting sign among others

Under the working title "Project Mega-wind," the Siempelkamp team carried out tuning of the material. The experts sought





IHK President Heinz Schmidt and North Rhine-Westphalian Research Minister Svenja Schulze present the Innovation Award to Michael Szukala (2<sup>nd</sup> from right) and Prof. Ernst Warnke from Siempelkamp



Areva machine housing in the fettling shop

Machine carrier of a wind turbine

and found support at the Freiberg University of Mining and Technology (TU Bergakademie Freiberg), the Fraunhofer Institute for Structural Durability and System Reliability in Darmstadt (Fraunhofer Institut LBF) and Aerodyn, an engineering company that specializes in wind turbines.

This teamwork produced results: The ductile cast iron, which had been produced for 50 years, could be improved insofar as that today cast iron can be produced with an increase in strength of 20 to 30%. Where for example manganese was previously added to the cast iron, now only silicon and other components are added to reach this strength. This enables increased utilisation of the new material or a 20% reduction in weight.





Machine carrier for  
7.5 MW onshore wind turbines



Rotor hub and machine carrier waiting for transportation



### Tuning the material to gain a competitive edge

The weight of the components supplied by Siempelkamp for the wind turbine nacelles alone could be potentially reduced from the current 65 to 52 t. With the reduction in weight, savings can also be made at the turbine tower itself and in the foundations. For Siempelkamp customers, this means an increase in efficiency of the entire turbine – thus resulting in a competitive edge.

This concept also convinced the IHK jury: in the presence of the North Rhine-Westphalian Research Minister Svenja Schulze, IHK president Heinz Schmidt presented the award to Michael Szukala, Managing Director of G. Siempelkamp GmbH & Co. KG, and Prof. Ernst Peter Warnke from Siempelkamp Foundry.

The next step: The new material, with the designation GJSF-SiNi 30-5, is currently being certified. This innovation can then go "on air" for the growing wind power market.



From left to right: transport of a 46 t machine carrier and a 36 t rotor hub





Rotor hub in the blasting shop



Rotor hub in the coating process

Areva component lower deck – bottom: view into lower deck during the ultrasonic testing for quality assurance



## Wind turbines: energy around the clock

**1991:** The Act on the Scale of Electricity to the Grid (Stromeinspeisungsgesetz) initiates the boom in wind power in Germany. It obliges electricity network operators to purchase the electricity generated for a defined price.

**1996:** The first wind turbines in the megawatt class 1 to 1.5 MW are constructed. This is an occasion for Siempelkamp to acquire ground as a market leader in the field of large and complex cast components.

**1999:** Siempelkamp receives the first order in the field of wind turbines. A wind turbine manufacturer from Northern Germany orders the series production of rotor hubs (unit weight 8.5 t), trunnions (5.9 t), stators (3.1 t) and three blade adapters (6.45 t in total) for a 1.5 MW onshore wind turbine. With this customer, the Foundry demonstrates on the one hand its competence in ductile iron and on the other hand its ability to cope with large unit weights and large orders.

**2000:** The Renewable Energy Sources Act (EEG) comes into force in Germany. This serves as a motor for the expansion of renewable energy and as one of the most important instruments for environmental protection.

**2001:** Siempelkamp is ordered to produce cast components to be installed in a 4.5 MW onshore wind turbine. Siempelkamp casts trunnions, rotor hubs, stators and machine carriers.

**2002:** This is followed by an order for cast components for a 5 MW offshore wind turbine.

**2002–2010:** Siempelkamp steadily expands its competence in the series production of cast components in 1.5 - 7.5 MW turbines. This includes axle journals, rotor hubs, stator stars and machine carriers in onshore areas.

**2011:** An installed output power of approx. 27,000 MW is achieved with wind power. The proportion of offshore wind power amounts to less than 1% (approx. 200 MW) – onshore capacity dominates significantly. However, the German offshore wind market is growing: from 2013 to 2017, the Wind Energy Agency Bremen/Bremerhaven (WAB) estimates an installed output power of up to 4,500 MW.\*

**2011:** A new milestone: start of series production of the previously mentioned cast components for 7.5 MW turbines, type A3 for Areva Wind – now also in offshore areas. Siempelkamp now produces in total 50% for onshore wind power and 50% for offshore wind power. The future of most multi-megawatt turbines clearly lies in offshore areas. We have recorded a good order intake that will guarantee high rates of utilization in the corresponding production areas over the next few years. A high net output ratio will be achieved within the group. All sectors of the company are involved in the production process: together with SNT (Siempelkamp Nuclear Technology), the machinery and plant engineering sector carries out the machining and coating; the foundry supports the casting product. "Raw casting plus machining plus open-sea-resistant coating equals delivery of ready-to-install components – wind turbine operators appreciate this overall competence," says Stefan Mettler.

**Until 2020:** An offshore wind output power of approx. 41,000 MW will be installed in Europe and will cover a market volume of approx. 100 billion euros according to estimates from the WAB. The WAB industry report also estimates that Great Britain, Germany, the Netherlands, Spain, France, Belgium and Denmark will play the leading roles here.

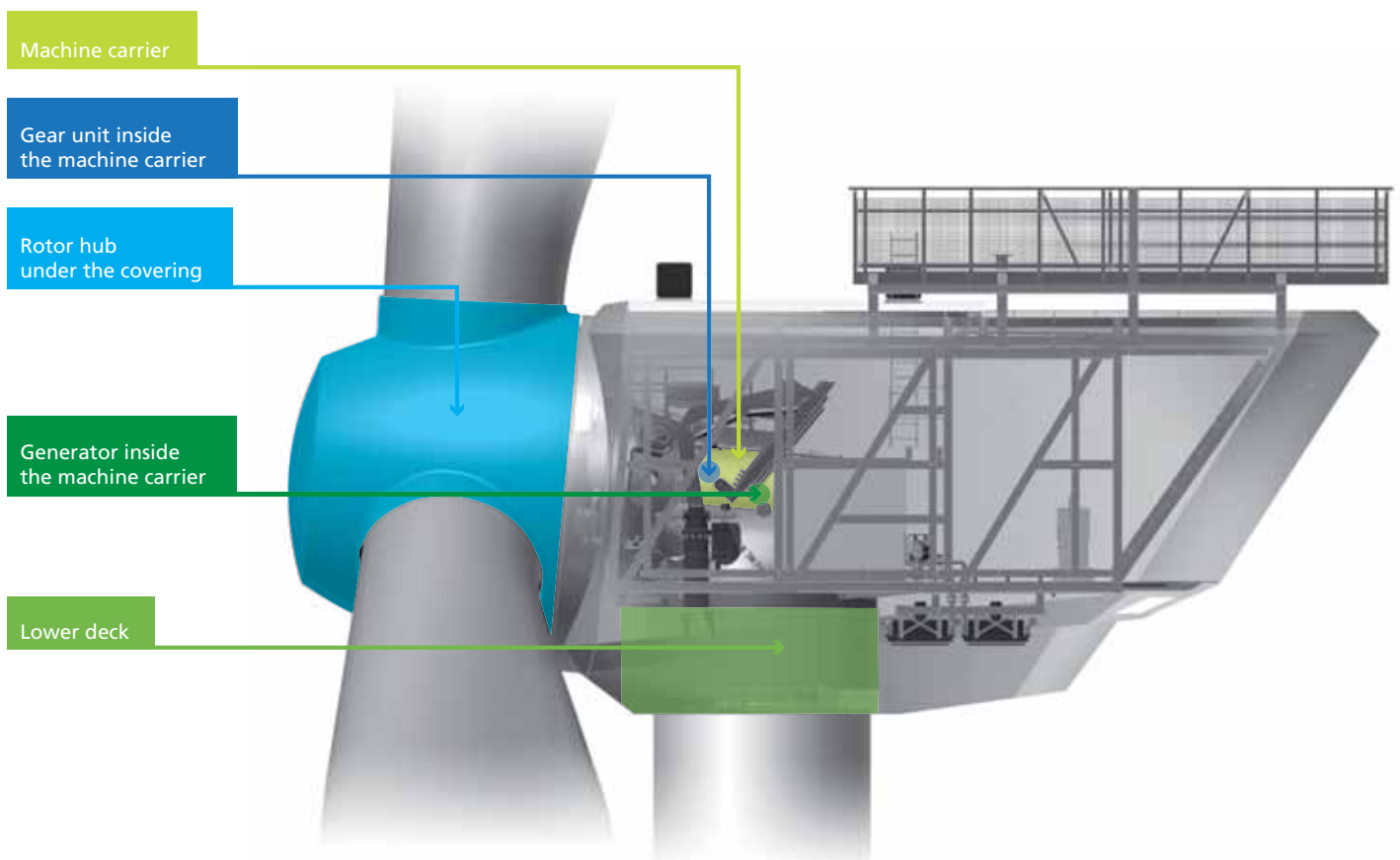
\* WAB industry report, June 2011

## Casting competence plus machining: portfolio



Constructed to be efficient, reliable and high-performing: as first-class high-tech products, wind turbines require the highest expertise from manufacturers and sub-suppliers. A clear edge in terms of knowledge and technology is a great advantage, especially in the production process: Siempelkamp has demonstrated itself as a top performer here. From machine frames to stator frames, the company casts numerous components for wind turbines. Our diagram shows where Siempelkamp casting competence is used – on average with over 1000 parts in total each year.

Machine carrier on a drilling machine



Nacelle cross section of an offshore wind turbine: Areva Wind type M5000 (source: Areva Wind)



## Machining to precision

Beyond casting competence, Siempelkamp is also a distinguished partner when it comes to machining. Customers in the field of wind turbines therefore receive two specializations rolled into one. Stephan Kaiser, Managing Director at Siempelkamp Foundry, says, "Decades of experience from Germany and abroad have lead to the conclusion that the processing center at Siempelkamp, with its capacities and extensive machinery, is a rarity. Opportunities for processing large unit weights and dimensions on the highest state-of-the-art technology offer the customer maximum efficiency and reliability."

## The benefits at a glance

- Ready-to-install delivery
- Competitive edge: machining directly at the manufacturer's
- Same contact person for the entire project
- Very close project execution for the benefit of the customer
  - Maximum production safety
  - Additional co-operation with external processors on a long-standing customer base

## Machine carrier

A central component of the wind turbine; the generator, rotor store and gear are housed in the nacelle. The machine carrier is exposed to highly dynamic stress and must therefore meet the requirements of high quality. Siempelkamp casts machine carriers with a unit weight of 15 to 64 t.

## Rotor hubs

The towers can be a maximum of 138 m tall. The rotor hubs are set inside of the nacelle. All three rotor blades are mounted at the nacelle. At "Energy 2010" in Hanover, a 13 t wheel hub was the eye-catcher at the Siempelkamp trade fair stand. Here, we impressively proved our role as leading supplier of finished large cast components for wind power generation. Siempelkamp casts a unit weight range of between 20 and 45 t. Future requirements could further increase the unit weights of the rotor hubs.

## Trunnions

The rotor unit is positioned on a fixed axis, i.e. on trunnion. This is not valid for all wind turbine manufacturers. The use of a shaft is another possibility for power transmission to gear unit and generator. Nowadays, the trunnion is also produced

after the ductile cast iron process and is thus a domain of Siempelkamp Foundry. Weights range between 6.5 and 36.5 t.

## Stator

The stator is part of the generator of a wind turbine (this is not valid for all wind turbine manufacturers). It is the fixed and rigid part of the drive system. Cast iron with nodular graphite is a particularly well suited material for this casting thanks to its viscosity. The material properties are also beneficial as they ensure that the material is highly resistant to wear. Cast components range from 4.5 to 16 t.

## Lower deck (components specific to Areva Wind)

This is the connection between the machine housing and the tower. The supply units for the machine head are housed in the lower deck – e.g., hydraulic components, control units, tools and storage systems. It has a weight of 16.5 t.

# From the model maker to the materials tester: Working together for the perfect wind turbine cast components

The task fields of Siempelkamp company sectors combine numerous professions. In order to guarantee perfect co-operation and smooth quality, the Siempelkamp Group carries out extensive training: 30 apprentices are taken on each year and almost all are consequently employed. Four professions play a central role in the production of a cast component in wind turbines.

**Technical model makers in the field of casting technology:** Without the perfect model, the parts will not fit – the title “technical model maker” marks the start of producing a cast component. The model maker builds models, model equipment and templates. The form as well as the design must fit – therefore the creation of technical and design documents also form part of the job.

**Casting mechanics for hand-moulded casting:** Here we focus on production and knowledge in the field of manual form and core production. Metal processing, melting and casting are part of the training schedule, as are the handling of



cast materials, casting control and quality assurance.

**Cutting machine operators** are particularly versatile in their use within the Siempelkamp Group. The production of parts and components is a part of the general profile. Orders are as varied as the respective customer needs – therefore the cutting mechanic procures, tests and implements order-specific requirements and information. S/he analyzes production orders and also assesses their technical feasibility.

If the cutting machine operator is dedicated especially to the field of turning and milling technology, the basics of sheet metal processing are part of the job. S/he is concerned with joining technology as well as welded, solder, adhesive and screwed connections. Cutting productions are also part of the training plan.

**Materials tester:** This profession brings to bear important expertise from the fields of physics and metal technology. The focus is on examining materials and parts



Materials testing: analysis of the new cast material for wind power cast components

and changing their properties via technological processes. This area of operations ensures quality in particular – because here, causes of error are determined in order to avoid sources of error. Materials testers deal with material and/or parts during the entire production process: with process-related and non-destructive tests through to the end of the production process.



# Quality assurance: Trust is good, control is better

The individual professions are milestones on the path towards the perfect cast component for wind turbines. Siempelkamp quality assurance connects these capacities.

Stephan Kaiser explains the processing steps of a wind power cast component



Quality assurance is our ultimate goal. To achieve this, we have implemented a transparent and secure project execution that guarantees high quality. Our customers have confidence in our capacities – we know how to act responsibly!" says Stephan Kaiser.

The Foundry uses the following four quality assurance modules:

**Babtec:** This is our CAQ system with modules from the automotive industry. CAQ stands for "computer aided quality". According to the saying "a picture tells a thousand words," figures and videos make test instructions clearer. This has the benefit that reaction times can be shortened and that processes can be

quickly customized and optimized. Via the traffic light system, measures are automatically tracked and completed.

**Cockpit:** This is a development by Siempelkamp Foundry. Information on the current efficiency level of a casting project is shown – from special technical features of respective products to the cleanliness of the production areas. Again, a traffic light system ensures more transparency in the team.

**HG-Visutec:** This is also an "in-house" development. Operating instructions and current data on the status of a project as well as messages regarding production changes are provided. Within the field of casting production, terminals are installed

upon which this information is called up by the employee. This contains data, facts, figures and production drawings.

**Six Sigma or "zero defect":** This is the schedule for employees with the zero-defect objective, the highest process security and efficiency for cast components.

# Dismantling of the Zion NPP: Double record for Siempelkamp

In October 2010, Siempelkamp Nuclear Services (SNS) was commissioned with dismantling the installations and reactor pressure vessel (RPV) of the US Zion NPP double block plant. This dismantling process represents the most extensive disassembly of an NPP that has so far been carried out not only in the USA, but anywhere in the world. Moreover, the project represents the largest single order value that a customer has so far placed in the nuclear technology business unit.

By Martina Glücks

During the dismantling of the Zion NPP, the Siempelkamp experts from the fields of dismantling and decommissioning are working hand in hand. The various areas of expertise at Siempelkamp will be cooperating across the pond: Siempelkamp Nukleartechnik and NIS Ingenieurgesellschaft on the German side, and the US subsidiary Siempelkamp Nuclear Services on the American side. Bundled synergies and the many years of experience of this well-versed team of experts are available to our customers for the safe, inexpensive and environment-friendly execution of their project.

In the interview, John Mageski, Managing Director of SNT US and SNS, as well as Christian Jurianz, Head of International Sales at SNT, explain to what extent German and American competences are able to impress here.





## Siempelkamp Germany plus Siempelkamp USA: A success concept with many facets



John Mageski and Christian Jurianz discussing the Siempelkamp dismantling skills

**An American company with a German parent – Siempelkamp – has acquired a significant single order for the largest dismantling project on the American market. What is this success based on?**

**John Mageski:** Our work and extensive experience from more than 16 dismantling projects that we have successfully carried out since 1995 under MOTA – since April 2009 MOTA has been operating under the name Siempelkamp Nuclear Services Inc. – is highly appreciated. Our core personnel can look back on 25 years of professional experience in the field of dismantling. The SNS engineers and technicians are some of the most respected and experienced specialists in the industry. With us, everything just clicks: the employees and the technologies.

**Christian Jurianz:** We Germans on the other hand are renowned for our know-how, our accuracy and the high safety level of our work. Furthermore, Siempelkamp was already well-known in North America before the acquisition of MOTA: We already had a name on the US market as a manufacturer of storage casks for the transport and storage of radioactive wastes and as a successful supplier of stud tensioning technology. The international decommissioning projects are also closely followed in the USA, so that our 15 decommissioning references in Germany have not gone unnoticed. Other countries closely followed the thermal dismantling of the RPV at the German Stade NPP with interest. With our wide range of services over 15 years, we also were involved with the dismantling of the Kahl experimental nuclear reactor down to the 'green field' stage and release from the Atomic Energy Act in October 2010.

**How is Siempelkamp currently positioned in times of the (unexpected) phasing out of nuclear power in Germany?**

**Christian Jurianz:** On the international level, we are the company with the greatest and most extensive experience of dismantling – thanks to our many years of working in the field of dismantling/decommissioning both in Germany and on the US market. This service aspect has become well-established in addition to the activities in the field of the supply of components for the construction of new and retrofitting of existing NPPs. In this respect we see ourselves well positioned in Germany for the future and are retaining all of our jobs.

**John Mageski:** One advantage is the bundling of the Siempelkamp competences – this has also opened up new business segments which did not previously exist for the US subsidiary. Customers in the USA do of course appreciate the "Made in Germany" label, but prefer the project to be executed through an American company.

**Speaking of Zion – which dismantling strategy is being used for the reactor pressure vessel?**

**John Mageski:** We have a strategy both for the mechanical and for the thermal dismantling process. A decision on which process to use will be taken not later than the end of 2011. This decision depends on the project length, the safety of the process and economic aspects. The safety technology of course also plays a decisive role.

**Which processes does the German parent company work with?**

**Christian Jurianz:** When we speak of the dismantling of the RPV, we clearly prefer the thermal method. We have already employed this method with great success at the multipurpose research reactor (MPRR) in Karlsruhe and at the NPP in Stade. Siempelkamp offers an excellent choice of tried and tested procedures – both thermal and mechanical – which can be implemented according to customer and project requirements, taking into consideration the safety technology.

**A look into the future?**

**Christian Jurianz:** With the coming into force of the 13<sup>th</sup> Atomic Energy Act Amendment on 6 August 2011, some NPPs in Germany have lost their entitlement to power operation. As a result, in approximately four to five years, there will probably be various decommissioning projects starting up in Germany. We are securing jobs and expertise in order to be prepared for these projects. Also in other European countries – e.g., in Great Britain and France – dismantling projects will be started in the near future. We have already performed corresponding initial studies for Italy.

**Mr Mageski, Mr Jurianz – thank you very much for this discussion!**

Three reference projects, three core competences:

# Stade NPP – Zion NPP – Karlsruhe MPRR

“It is not the process which determines the task, but the task which determines the process!” Three current projects illustrate how multifaceted the range of services of Siempelkamp Nukleartechnik is.

## 1. RPV dismantling at the Stade nuclear power plant: innovative concept



Stade NPP undergoing dismantling since 2005

On 14 November 2003, the nuclear power plant in Stade was taken off the grid after 30 years of operation for economic reasons. Since September 2005, the plant has been in the residual operation phase and dismantling has begun. Such dismantling is a complex task and is performed in five phases, which are scheduled to be completed in 2015. The disassembly, dismantling, packaging and disposal of the reactor pressure vessel (RPV) are constituents of phase 3.

In 2008, the team of experts at NIS Ingenieurgesellschaft mbH was commissioned by E.ON Nuclear Power with the dismantling and packaging of the RPV at the Stade nuclear power plant: the specialists disassembled, dismantled and packaged the reactor pressure vessel, RPV lid and the peripheral equipment. Dismantling of the RPV was mainly carried out thermally using the

oxygen-propane cutting method. Mechanical cutting processes such as using a band saw were employed in support.

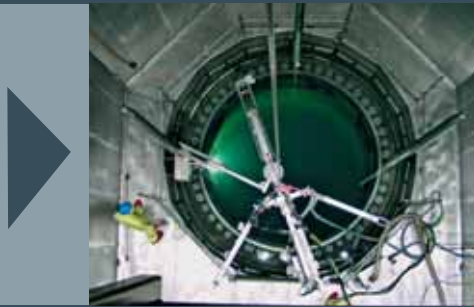
Planning, procurement of equipment and testing as well as putting into service on site were carried out within 16 months. The actual process of dismantling the RPV was performed within a period of four months. The high speed of the project made it possible to thermally dismantle and package the lid within just 13 working days.

Beforehand, NIS already performed the important planning work that enabled the project to be executed quickly: e.g., sample-taking and dose rate measurements. “With the help of the sample-taking in the RPV, we have created a reliable data record to be able to plan the subsequent loading of the waste containers precisely,” says Andreas Loeb, NIS Project Manager in Stade.

In 2010, NIS was awarded a further contract for the Stade project: the dismantling and clearance planning for large components. Here, the focus was on the development of a dismantling concept for the polar crane, as well as a clearance concept for the containment. This contract is associated with the performance of the radiological assessment of the two components. With over 350 individual tests and their radiological evaluation, NIS created a reliable basis for the planning process.

The contract was completed at the end of 2010 – exactly on time and within budget.





Sample-taking on the RPV



Assembly of the dismantling equipment in the fuel assembly storage pool



View of the ventilation technology housing over the fuel assembly storage pool – set up for dismantling



Transport of the RPV



Installed ventilation technology



Mechanical dismantling of the RPV flange ring using the band saw



Dismantling of the RPV lid using the oxygen-propane cutting method in the air



Transport of the RPV flange ring



Transport of the shielding plate



Control station during the dismantling process in Stade



Thermal dismantling of the RPV hemispherical head



Loading and packaging station for the dismantled RPV parts



## The Stade project – an overview

- RPV: thermal dismantling in the air and on a dismantling turntable using a band saw
- RPV lid: also thermal dismantling in the air and on a dismantling turntable using a band saw

## 2. Zion NPP: dismantling of the RPV and the reactor core internals – challenge with a new process



Zion NPP undergoing dismantling since 2010

40 miles north of Chicago along the banks of Lake Michigan is the Zion nuclear power plant. In 1998, after more than 20 years of operation, the two reactor units of the NPP were finally taken off the grid. The dismantling of the Zion NPP started in 2010 – and will be the most extensive dismantling process that has ever been carried out in the United States.

In October 2010, Siempelkamp was awarded the contract by ZionSolutions to segment both the reactor pressure vessels (RPV) and the core internals. The reactor core internals, consisting of components such as the core shroud, moderator tank, core structure and thermal shield, are dismantled under water in their installation position. Segmentation under water ensures sufficient shielding against radioactivity.

For the segmentation of the reactor pressure vessel, Siempelkamp developed a concept with two technical processes: a mechanical and a thermal dismantling process.

The **mechanical process** by means of which SNS has so far successfully performed all RPV dismantling is based on specially designed and produced cutting tools that make use of tried and tested designs and technologies from earlier SNS decommissioning projects. A few examples of this technical equipment are the volume reduction station, the circumferential-hydraulically operated rotating cutting equipment (C-HORCE) and the bolt milling tool. In order to guarantee perfect performance during use, the operating capability of each dismantling tool is tested at the test stand on the SNS premises.

The **thermal dismantling process**, which is available as an alternative, has already been used with great success in Stade NPP. The so-called oxygen-propane cutting method has the great advantage that the dismantling work can be performed within a shorter period. The cutting speed for 200-mm-thick steel is 4.0 mm/sec, whereas for the mechanical method it is only 0.25 mm/sec.

The reduced use of additional technical equipment and the high level of process reliability also speak in favor of the method. The result: a reduction in the radiation protection requirements and the radioactivity doses to which the employees are exposed. Put briefly: the oxygen-propane method guarantees a high level of process reliability both for the company performing the dismantling and the operator. The use of this process would be a premiere for our colleagues from SNS and the American market, at the same time representing a guarantee of maximum planning reliability.

Since April 2011, Siempelkamp has set up construction site offices on the Zion site and started with the shielding preparations. After the decision on the appropriate dismantling process for the RPV (not later than the end of 2011), the start of the segmentation work is planned for the third quarter of 2012. Dismantling of the reactor pressure vessel and reactor core internals is to be completed in 2014.



Mechanical dismantling process: Rotation device "C-HORCE"



"C-HORCE" at the test stand on the SNS company premises



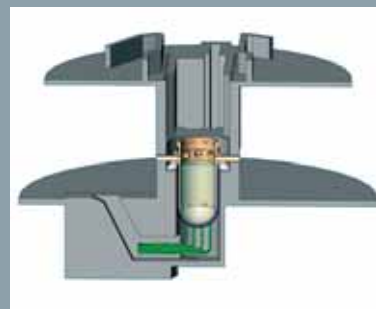
Testing of the remote-controlled replacement and wear parts such as a saw blade



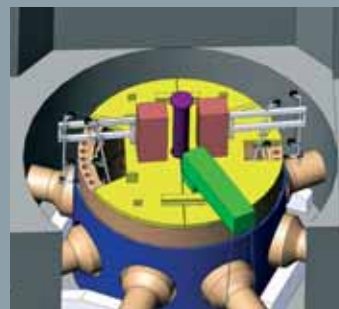
Saw blade segments of the volume reduction station at the under-water test stand



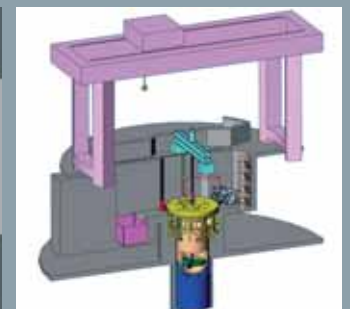
Model of the volume reduction station



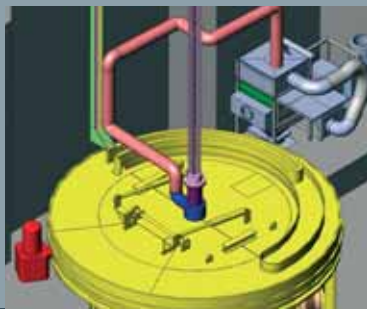
Thermal dismantling process: Initial situation in the reactor before the beginning of the dismantling work: view of a cross-section of the RPV



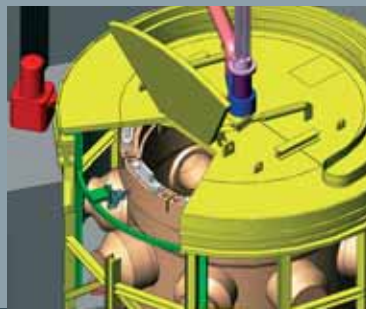
Installation of wire saws on the RPV for preparatory segmentation work for the subsequent thermal cutting process



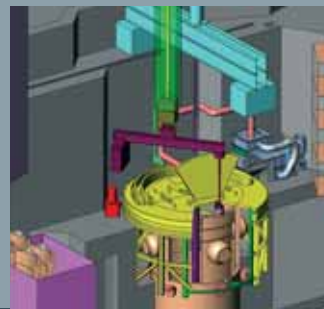
View of the RPV lifting equipment as well as the loading and packaging area (left) for the RPV segments



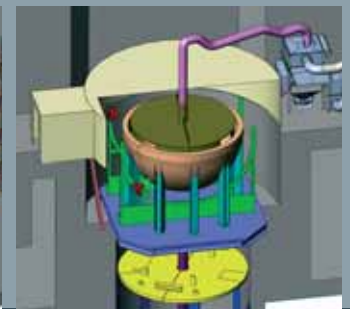
Filter and ventilation system for thermal dismantling



View of the installed shielding plate and the mobile high-power thermal cutter (left, in green)



Dismantling of the first RPV ring and packaging in transport casks



RPV hemispherical head prepared for thermal dismantling

## The Zion project – an overview

- RPV: two processes available for selection – thermal or mechanical dismantling in the air
- Reactor core internals: mechanical dismantling under water in the installation position



### 3. Karlsruhe MPRR: dismantling and disassembly of the RPV as well as dismantling of the biological shield



The multipurpose research reactor on the site of the Karlsruhe Institute for Technology, KIT

The multipurpose research reactor (MPRR), which was decommissioned in 1984, is one of the nuclear technology plants currently being dismantled on the site of the former Karlsruhe Research Center, now known as the Karlsruhe Institute for Technology (KIT). The dismantling concept for the MPRR provides for complete removal of the plant for the creation of a 'green field' in eight dismantling steps. Since 2008, the last two steps have been ongoing.

**2008 – 7<sup>th</sup> dismantling step:** The experienced dismantling team of NIS started with the contract to dismantle the RPV together with its core internals. Here, the main process selected by the experts was the thermal oxygen-propane cutting method for seg-

menting the RPV in the air. Additionally, mechanical dismantling using a band saw was applied. The reactor core internals were cut up both thermally and mechanically under water. For the thermal underwater dismantling process, the plasma cutting method was available, supplemented by mechanical tools – these were used for the control rods, for example. With the dismantling of the RPV and its internals, a total of 400 t of material were segmented and packaged into casks and containers suitable for final repository.

**2009 to 2011 – 8<sup>th</sup> dismantling step:** The SNT team goes into action. The dismantling of the activated heavy concrete of the biological shield was performed using a remote-controlled demolition excavator complete with accessory equipment. The excavator was attached to a specially produced platform, the suspension and fixed mounting frame. For the dismantling of the steel liner, which was located on the inside of the biological shield, band saws were used. Here too, all of the equipment was first successfully tested in the test stand before being assembled in the reactor building. 300 t of heavy concrete and approximately 10 t of steel were dismantled and packaged in a manner suitable for the final repository.

All of the work – from concept planning and production to delivery of the dismantling tools including accessories, assembly, final repository packaging, testing of the dismantling equipment and of course the actual dismantling work – was in the hands of Siempelkamp Nukleartechnik!



Initial situation: view of the RPV before the start of assembly and dismantling



Dismantling of the RPV lid and the packed bed using a mobile band saw in the air



Application of the thermal and mechanical dismantling process for the moderator tank under water



Dismantling of the thermal shield using the plasma cutting process under water



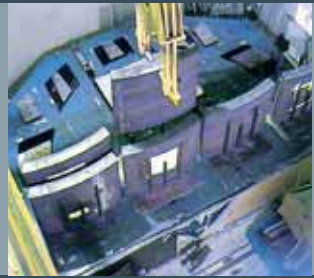
After the recovery of the lower packed bed from the RPV, it was dismantled using the band saw



Segmentation of the RPV flange ring on a band saw



The main coolant lines being drawn out of a device of the biological shield for dismantling



RPV segments being put into storage in buffer storage racks for subsequent packaging



RPV flange ring completely separated using the thermal cutting process



The dismantling of the RPV and its installations is followed by the dismantling of the equipment and decontamination of the rooms



Remote-controlled dismantling of the biological shield



Dismantling of the biological shield using the demolition excavator on a platform of the suspension and fixed mounting frame



Concrete filling device for comminution and packaging of the heavy concrete segments of the biological shield

## The MPRR project – an overview

- **RPV: mechanical and thermal dismantling in the air – in the installation position, as there was no room available for removing the RPV**
- **Reactor core internals: thermal dismantling under water in the installation position**
- **RPV lid: mechanical dismantling on a dismantling turntable using a band saw**
- **Displacer / packed bed: mechanical dismantling in the air on a dismantling turntable using a band saw**
- **Biological shield: mechanical dismantling process using standing and hanging frame with remotely-operated demolition equipment and subsequent comminution of the activated pieces of concrete in a concrete treatment unit**

## Project goals: process reliability for disassembly / dismantling / packaging

- Performance in line with protection targets – e.g., dose minimization, waste minimization, personal safety, occupational health and safety and plant protection
- Technically safe implementation
- Risk minimization
- Waste minimization – optimum use of waste containers and disposal routes
- Packaging in compliance with the intermediate and final repository conditions
- Cost transparency

**Conclusion:** Dismantling is performed in accordance with an optimized technical process – always taking into account the radiological conditions, maximum safety technology, the project duration and costs.



# Dismantling project live: "Every day a new challenge!"



Dieter Stanke with a manipulator on a test stand in the NIS pilot plant

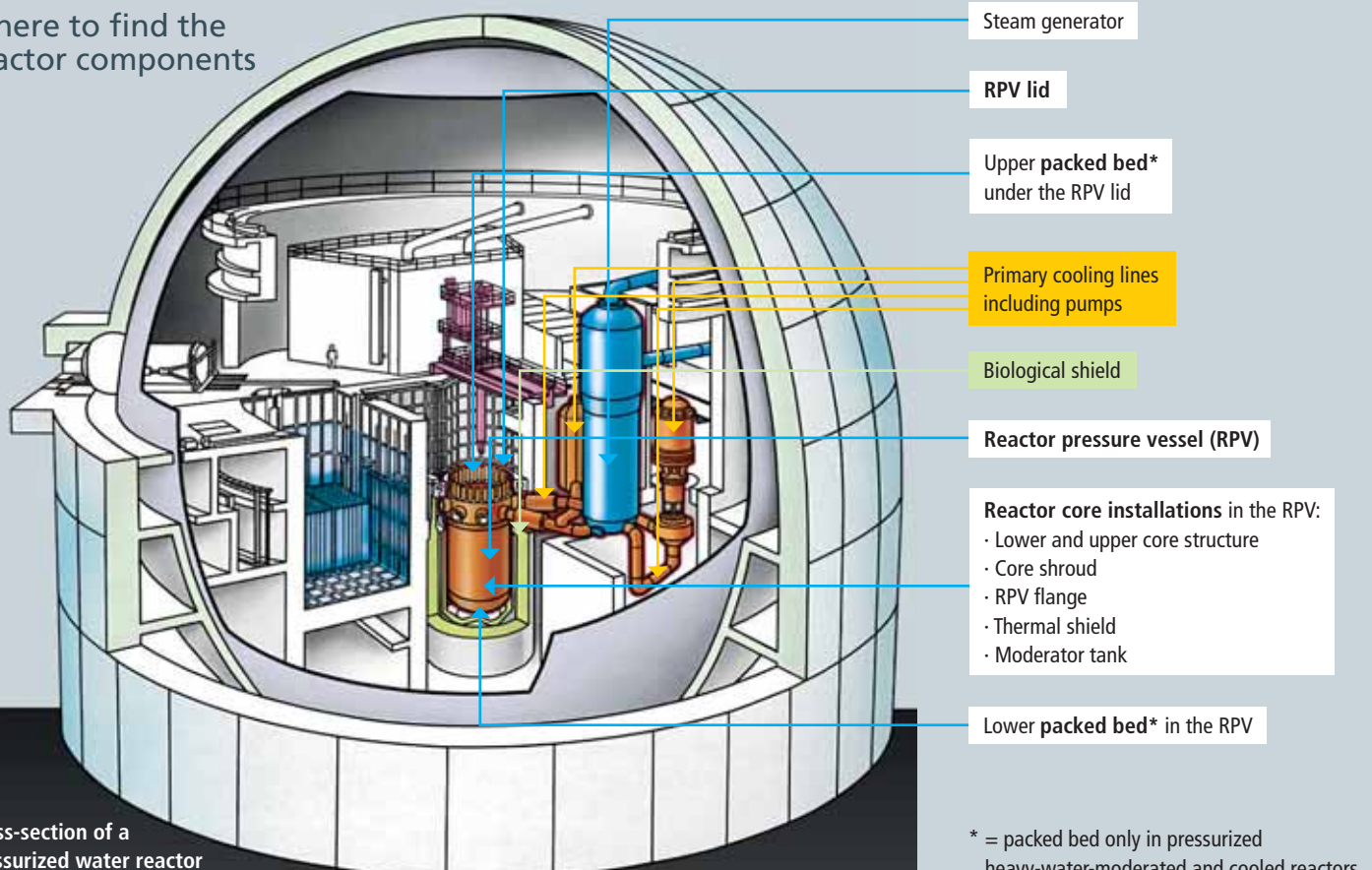
Techniques and technologies are a success factor of Siempelkamp dismantling projects, with manpower being a second one. As an NIS mechanical engineer, Dieter Stanke is part of this success. The 53-year-old has been working in nuclear technology for more than 27 years – and sees his involvement in a dismantling project as a new and exciting challenge every day.

In my opinion there is no field of work that is so full of variety as nuclear technology. You have to have a large amount of technical expertise at your disposal and be at home in practically all fields which technology has to offer.

Electricity, water and gas lines have to be laid from A to B. Electrical engineering, supply technology, lifting technology and ventilation technology represent the ambitious technical challenges that we have to overcome. Every dismantling concept is always adapted specifically to the space conditions that we find on site. Here, it is important to take into account the radiological regulations and the highest safety aspects.

One aspect of my work which appeals to both me and my colleagues: no two projects are the same! We are responsible from the concept, through procurement, testing, personnel training and execution, to the final scrapping of the technical equipment that has been developed. Some of our technologies have development and construction times of up to four years. They are then used for eight weeks before being scrapped, even though the machine technology is working perfectly. This then meant the final point of a highly concentrated, highly professional and highly individual procedure."

## Where to find the reactor components





# From shutdown to dismantling: the process

## What happens in the nuclear power plant ...



The plant is shut down, the fuel elements removed from the reactor pressure vessel. In the fuel assembly **storage pool**, the spent fuel elements are given their new home for

**at least 5 years**

– including after-cooling and subsequent packaging in CASTOR® casks.

## ... and this is where Siempelkamp works!



Siempelkamp takes advantage of this period – and

- supports the plant operator as part of the decommissioning approval planning process – e.g., in the submission of applications such as the compilation of authorization documents to actual approval, support and communication with the authorities, approved experts and test bodies, taking into account the current legal requirements and regulations
- develops decommissioning strategies and technologies – e.g., studies and concepts for dismantling, tools and waste management structures, precisely coordinated with the type of reactor and NPP-specific space conditions.

The approval concept is sometimes drawn up in partial steps and sometimes in its entirety: analysis – strategy – technology

## After approval, the procedure continues on site at the plant – with Siempelkamp

Primary circuit decontamination is due (decontamination of the activity inventory)



This is followed by **remote-controlled dismantling / disassembly**. “Higher activated comes before less activated” is the rule. Here, it is not possible to use any standardized processes.

This is when the **Siempelkamp detailed planning procedure** comes into its own, which was already started during the approval phase.

Thermal or mechanical dismantling methods are used in order to dismantle the reactor core internals, the reactor pressure vessel and the biological shield.

At the same time, the **waste treatment process** accompanying all phases of the decommissioning procedure continues. The important points:

1. Determination of the radiological data – e.g., radiation protection planning and control, clearance measurement and documentation.
2. Selection / definition of the waste treatment method, e.g., for treating solid, liquid and gaseous radioactive wastes, also taking into account volume reduction.
3. Delivery and project management during the waste treatment phase.
4. Packaging of the residual substances for the final repository.

**The bottom line:** Siempelkamp provides the right strategy – whether in the approval process or in the technical field (radiology, mechanical, electrical and process engineering)

Siempelkamp Maschinen- und Anlagenbau build the world's biggest knife-ring flaker setting a

# Big, bigger, strander

**How do you call a machine that – built by engineers in their own factory – already beats all records as to its dimensions? Being unique for the size of this machine type throughout the world? And standing for the innovative performance of the company? The name search for the Siempelkamp strander 250-850-56 (diameter – cutting width – number of knives) is only a part of the whole – the story behind it is a matter of a complete system.**

By Wolfgang Holzer

In May 2010 already OOO DOK Kalevala St. Petersburg, Russia, signed a contract for its location in Petrozawodsk, province of Karelia, on a complete line for OSB. 30 years after sale of the first OSB press this order is a significant milestone for Siempelkamp as full-system supplier and its market positioning. In addition to the particularity of being Russia's first OSB line this order features further potential of launches: For the first time Siempelkamp builds an own round log knife-ring flaker – the world's biggest strander. Big challenge for people involved in planning, designing and manufacturing processes at the Krefeld site.

Not only dimension or output volume (45 t/h at 0.65 mm chip size) of the new Siempelkamp knife-ring flaker looks like a new record: For operation of this giant a motor power of 1,250 kW is required. For comparison: With the required quantity of electricity per hour a two-persons-household could be completely supplied during one year. To test the 10,000-Volt motor with a speed of 1,000 rotations per minute, even two diesel units had to be taken to the manufacturing site in Krefeld. As a result of the direct connection to the

mains in Krefeld the supply of the complete district would have been probably impaired. Additionally 10 m<sup>3</sup> of logs for the first start of the strander were brought. A quantity of timber that was processed by the machine to first-class strands within 100 seconds only. A short-term pleasure only? Not at all for the customer. OOO DOK Kalevala will use the knife-ring flaker very soon in its complete OSB line.

## **Record strander: a very special feature of the complete line**

The new Siempelkamp strander perfectly fits in the complete line offered for OOO DOK Kalevala – a significant example for Siempelkamp's concept "supplier of equipment from one source". In addition to a continuous press, a 9' x 50.4 m ContiRoll®, the complete front-end equipment including debarker, dryer, screens, glue mixing station, dosing system and metering bins formed part of the scope of order. To unfreeze the frequently frozen logs on site of the customer additionally so-called log ponds are provided. Separate energy systems are also included in the scope of supply. The portion of finishing equipment includes two double-diagonal

saws and cooling device and stacking unit as well as large stack magazines and cut-to-size and packing lines.

The order offers another innovation in the field of finishing. Siempelkamp Handling Systems developed a new stacking system whose execution corresponds to customer's request as to minimum panel board width of 635 mm only. The safety gear integrated in the machine provides for continuous stacking process and the subsequent stack transfer to the next machine in spite of fast cycle times of the line. The stacker allows for the handling of complex cut-to-size images as well. Another special feature of the order is the two-stage concept developed by Sicoplan for performance extension of the line.

## **Two stages for complete performance**

The OSB line operated by OOO DOK Kalevala will produce daily 750 m<sup>3</sup> in the first stage. After upgrade to stage two the double capacity of 1,500 m<sup>3</sup> per day will be achieved. The forming and press line has been already designed for such a high complete performance – front-end and finishing systems will be extended later

further milestone as full-system supplier

# 250-850-56

The strander in the test phase



according to the first stage. Also the performance of the energy system will be increased in the range of this concept of 50 MW and doubled to 100 MW by means of a second system. Additionally, a twin of the new Siempelkamp strander will contribute in the second section to the overall performance of the line.

The concept has an enormous benefit for OOO DOK Kalevala: The line does not have to be stopped to upgrade to double

capacity. The outstanding highlight of the OSB line will probably be the new strander. It has been planned, designed and built at the Krefeld site and will soon go on a trip to Eastern Europe to be assembled and commissioned there through Siempelkamp.

#### A strander for Russia

Russia's first OSB-Strander is an innovation. With a cutting width of 850 mm

Discharge section in the test unit







The worldwide biggest knife-ring flaker in the Siempelkamp production halls

and an inner diameter of the knife-ring of 2,500 mm equipped with 56 recently developed knives the machine runs at a cutting speed of up to 35 m/s. The maximum throughput rate of 45 t atro/h combined with the high cutting width turns the strander as to extraction volume to the world's biggest knife-ring flaker. A record that becomes obvious when looking at the dimensions of the strander: with a length of 20 m (strander plus filling station), height of 3 m and width of 7.80 m the blue and yellow jumbo impresses the observer.

The dimensions of the strander however entail some challenges, but also provide

for favorable occurrences at the same time. "The larger such a knife-ring flaker is, the more satisfactory the proportion of chipping and down time," explains Wolfgang Holzer, group leader of the design department. For the new strander a chipping time of 61% is compared to a reduced downtime of 39%. In addition to that, exact cutting precision is enabled through such a large flaker: it is able to produce chips of 0.65 mm with a precision of  $\pm 1/10$  mm. The dimensions of the flaker also have a positive impact on the throughput rate: The entry time is up to approximately 15 seconds, replenishment is already possible after 9 seconds. This velocity requires exact planning until the smallest element.

#### The increased benefit is in the detail

The particularities of the new strander design are not only reflected by large dimensions, but also by smaller details. The front carrier ring is equipped with a set of high-quality wear segments. For the customer a real advantage: It is no longer necessary to replace the complete carrier ring; only the wear parts are exchanged. Owing to the improved knife arrangement the chip quality is additionally increased.

Scorers integrated in the knife units facilitate clear cutting edges, a special mechanical system provides for optimal clamping force of the knives by means



Replenishment after 9 seconds: possible by the new filling station



The hydraulic aggregate operates with 2 x 110 kW

## Log-pusher and clamping wedges

of centrifugal force (centrifugal wedge clamping principle). Due to the reduced cutting angle – previously 34°, now 29° – up to 2% less of fine materials is generated. A knife is easily changed by means of pressing the centrifugal wedge down. This is done automatically via additional hydraulic cylinders and a hydraulic motor thus minimizing the maintenance expense. This is a clear benefit for the customer who will very soon produce OSB as Russia's first plant operator.

## Application for the strander

OOO DOK Kalevala will apply the new knife-ring flaker within its new complete OSB line that is planned, designed, built, delivered, assembled and commissioned through Siempelkamp. As raw materials for the produced OSB local timbers are primarily used: 90% of aspen is machined, a timber that is especially well suited for structural panels due to its bright optics and low mass. By means of a groove and tongue panel plant to be installed as well floor panels are made. These products are applied among others within the group of the principal: OOO DOK Kalevala forms part of the structural engineering group Kompakt realizing large industrial buildings and requiring OSB accordingly.

The customer thus has to meet with his own requirement – the demand is huge. The high demand for finished products makes a line with maximum capability indispensable. The latter one amounts to a final extraction capacity of 1,500 m<sup>3</sup> of panels per day. For this purpose OOO DOK Kalevala is in need of quite a lot of timber that at first has to be machined to strands in a flaking process. A very sophisticated request of the customer Siempelkamp has complied with by means of the strander 250-850-56. Mid-2012 already the new knife-ring flaker will be ready to operate. Last but not least the question remains unanswered how this record machine shall be named.



Main drive motor



Impressive dimensions – strander from its main drive side



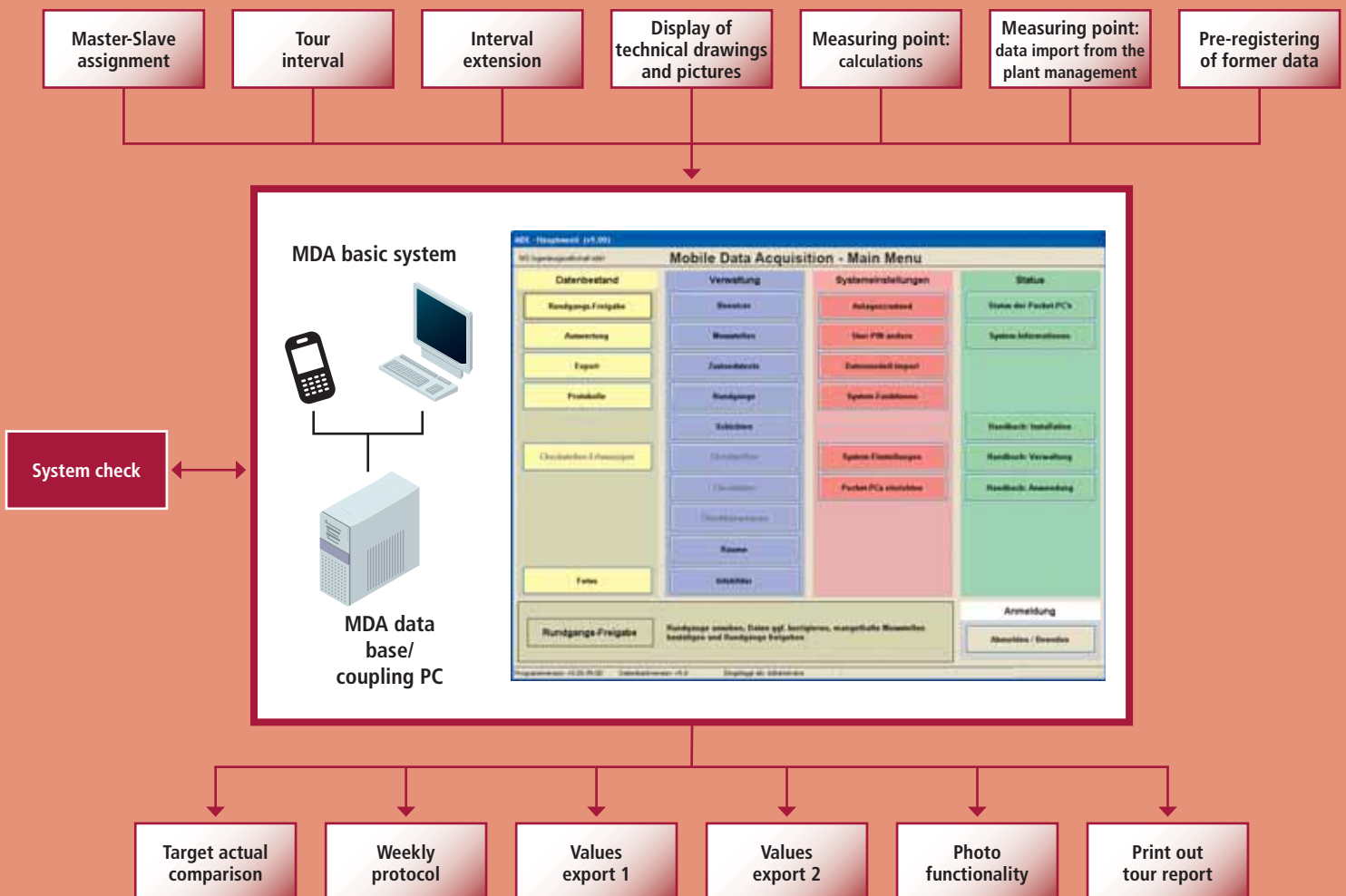


Small cause, great effect:

# 10 years of mobile data acquisition with Siempelkamp

Trust is good, control is better – and best of all in many ways. Since 2001, the mobile data acquisition system MDA from NIS Ingenieurgesellschaft mbH in Alzenau has been an important control entity with regard to condition monitoring, assessment and early fault detection. This check forms the basis of the preventative maintenance of plants and machines – thus securing the budget of the operator!

By Georg Spielmann





## Inspection round with a mobile computer

Production plants are targeted towards productivity (through high plant availability) and efficiency. High safety regulations are particularly in place as regards the operation of producing plants – here, the focus lies upon the maximum level of supply safety and plant availability.

In this context, it is not only politicians, authorities and surveyors that direct their attention to safety and monitoring. The operators are also interested in an efficient, well-documented plant monitoring system and therefore place high requirements on the completeness and transparency of the data acquired within the framework of the plant monitoring system.

The high demands placed on monitoring and inspection fulfill diverse administrative and technical measures. As a result, it is now state of the art that a majority of the plant data is acquired, evaluated and documented by the present control devices.

However, what happens with the majority of plant data and conditions, e.g., oil levels in the transmission, leakages or crack formations? They have an impact on the operation of the plant, but cannot be automatically monitored for technical reasons.

### Inspections without fuss or quibble

Here, responsible plant operators do not simply close their eyes but will look for a solution as they know that unforeseen interruptions to operation due to undetected damages are always associated with significant costs. In the worst-case scenario, a total loss of plant components must be expected, something that must be avoided at all costs.

So what is to be done? Generally, regular inspection rounds throughout the entire plant area ensure a large proportion of safety and prevention. Here, simply reading the measured value, the filling level or the valve position would not be sufficient. Every peculiarity must be noticed using all senses, e.g., when part of the insulation is damaged, when a motor overheats, when a peculiar running noise is present on the transmission, when a leakage is present, when brittleness or crack formation can be detected. In such cases, the reaction must be immediate, so that the repair can be carried out straightaway and any more severe consequential damage to the plant can be averted.

It is not only inspection rounds that are of significant importance when plants have to be reliably and safely monitored. Special attention must also be paid to the start-up of a plant, e.g., following maintenance or during commissioning. Here, a multitude of conditions and circumstances (e.g., the correct installation of fittings, valve positions, inspection of the control cabinet wiring) are to be acquired and documented prior to the start-up procedure.

In the past, this was always associated with a great deal of effort as the inspection rounds were carried out with the aid of paper lists. In turn, the plant conditions and the peculiarities acquired here then had to be manually entered into a central data retention system in the event that they did not simply disappear in the filing tray or the archive. Disadvantage: the processing of the data at a later point in time was not possible.



Evaluation of the inspection round in the shift supervisor's office



Mobile data acquisition system

### Mobile data acquisition system – developed for customers together with customers

To be able to quickly acquire and evaluate these relevant conditions, in 2001 NIS developed the mobile data acquisition MDA for inspection rounds in plants and on machines.

The components of the mobile data acquisition system are, on one hand, the mobile data acquisition devices required for the inspection rounds (mobile handheld computers) and, on the other hand, data acquisition and processing software.

Special characteristics are to be taken into account when selecting the mobile computers to be utilized. "It was – and continues to be – particularly important to select a type of device that can be deployed in industrial conditions with hardly any restrictions, that is light and

easy to handle, has a long battery life and is simple for the user to use," explains Dr Aldo Weber, Process Data Processing and Consulting Division Head.

The basic idea for the development of MDA: The operator of producing plants should profit from a tool that provides advantages on two counts. First, the handy acquisition and evaluation of plant data and conditions in an automated manner – second the MDA simultaneously facilitates long-term evaluation of the acquired data and conditions. As the requirements and needs of individual plants and plant operators are extremely different, the aim was to get the customers on board at an early stage. "As a result, a system with a modular structure has been created that contains a multitude of configurable functions and can be adapted to the individual needs of our customers without any problem whatsoever," says Dr Aldo Weber.

The functionality of the software is divided into the fields of inspection-round planning, data acquisition and evaluation. The administration, e.g., the creation of inspection points, determination of authorizations, threshold values, calculation algorithms as well as inspection rounds and the assigning of the corresponding inspection points is carried out within the context of the inspection-round planning.

With the MDA system from NIS, inspection rounds can be defined for the early, late, day and night shifts and restricted to a particular mode of operation, e.g., full load, part load or maintenance. Depending upon the plant, up to 30 inspection rounds with up to 8,000 inspection points to be addressed quickly mount up.

During the inspection round, the person carrying out the inspection is informed of all inspection points to be addressed (in the planned order as standard) on the mobile computer.



Mobile data acquisition for industrial plants





In doing so, the selection of the inspection point can be carried out manually or, in order to minimize errors, using a barcode reader integrated into the device. Important information concerning the inspection points are displayed to the person carrying out the inspection on the mobile computer. For example, this includes space or hazard information as well as information images.

To be able to acquire peculiarities without much effort, the mobile computers are equipped with a camera. The images taken during the inspection round are automatically assigned to the current inspection point and are immediately available during the evaluation of the inspection round.

All relevant inspection rounds complete with their inspection points and status are displayed during the evaluation. If inspection rounds or round positions have been omitted or if inspection points have not been read correctly, this is immediately

displayed to the shift supervisor during the evaluation. The NIS evaluation algorithms facilitate the quick and early detection of peculiarities and/or faults. They make a significant contribution with regard to making the resulting necessary decisions / initiation of measures.

The connection potential of the mobile data acquisition system to the operation management system / plant control system in particular facilitate a collation of all important process and plant data to a central data platform. The operator quickly obtains a multitude of important additional information that is essential during the evaluation of system procedures or the planning of maintenance and servicing processes.

#### The maintenance concept – as individual as our customers

The demands placed on the MDA system from customer to customer vary just as much as the requirements for system

maintenance. From a telephone hotline to an update service right through to a 24-hour on-call service, the NIS maintenance concept leaves nothing to be desired and is exactly tailored to the plant operator.

#### Successfully established on the market

The MDA quality management is just as mobile as the system: "Since its market introduction, we have been constantly reorienting the system to the needs of our customers and keeping it state of the art," says Dr Weber. MDA is used in many German power plants and has enjoyed a high level of acceptance since its introduction onto the market.

In doing so, dialog with the customer as a basis for the updates is a definite factor: Regular user meetings serve to provide an exchange of experiences between the users and NIS as the supplier. Numerous impulses for the development of new features are given here. As a result, the chosen path of listening to our customers and showing an interest in their needs and desires is constantly continued and allows the system to "live". The universal use and the measurable quality increase with regard to maintenance and inspection of the plants make MDA an NIS success story that even continues to be written ten years after its successful placement on the market!



MDA with connection to the plant management

Drying by Buettnner to increase the heat value of biomass



Buettner's biomass drying system:

# Increased performance for Green Power!

**In May 2011 the first Buettner biomass predrying system went on line at the power plant of Société de Cogénération de Saint-Félicien, S.E.C. in Quebec. Less than a year after signing the contract on June 3, 2010 and six months after start of installation, the Siempelkamp daughter finished this turnkey project perfectly – anyhow, the first project of such kind with an energy company!**

By Dirk Koltze

This Buettner premiere is in operation in Saint-Félicien, a rural area in the province of Québec. Here a 24-MW Combined Power and Heat (CHP) plant has been operated for 13 years by ENEL Green Power. The plant generates electricity and steam resulting not only in the benefit of providing "energy from renewable sources". Also the issue of waste management arising from biomass wastes for the region ends up in smoke.

In September 2010 Buettner supplied for this turnkey project a single-path drum dryer 3.0 x 15 R (10' x 49', type R) including ID fan, ductwork, cyclones, steel structures, insulation, complete materials handling equipment, visualization as well as all electrics. Additionally included in the

scope of supply is a 50-t (55 sT) wet material bin. Buettner was also responsible for the complete installation and start-up.

The dryer system is designed for an annual drying capacity of 120,000 t (132,280 sTPY) of biomass. Approximately 44,000 t (48,500 sTPY) of water are evaporated during this process.

The Buettner system dries landfill biofuel and biomass which is used as fuel for the plants' boiler. The Biomass primarily consists of mulch, bark and wood wastes.

## ENEL Green Power without CO<sub>2</sub>-power

The Canadian power plant Société de Cogénération de Saint-Félicien, S.E.C., is a daughter of the Italian ENEL Green Power. This branch of the ENEL group is dedicated to the topic of "renewable energies" in European and North American markets.

With a production of nearly 21 Terawatt hours\* per year ENEL Green Power is the global market leader in this field: The demand for energy of about eight million families is covered through the company whilst at the same time 16 millions of tons of carbon dioxide emissions are avoided per year by their own account.

\* One Terawatt hour corresponds to 1,000 Gigawatt hours or one million Megawatt hours. "Watt hour" is a derived physical unit of measurement for "energy": It results from: Watt hour (Wh) = Watt x hour. This multiplication is derived from the formula energy = performance x time





Wet- and dry material conveyors to Buettner dryer

### Biomass pre-drying: The benefits.

Pre-drying of the biomass is an important step to increase the performance of the power plant. Insofar Buettner paid special attention to the dryer efficiency during the system design. This is achieved by special provisions preventing heat loss in the hot air duct system. The boiler exhaust gases are directly taken at the exhaust stack, are re-guided through the dryer drum, and are utilized as the energy source for the drying process. The system functions autonomously – no other energy source is required! The dryer is equipped with specialized internals to ensure maximum water evaporation.

Increased performance is one positive effect; on the other hand the required quantity of fuel is reduced. Due to the pre-drying process the heat value of the biomass is increased. As a result thereof less fuel is needed to be operating the

power plant at full capacity. Also during wintertime the high-performance capability has no limits.

Talking of wintertime: The tough project schedule required a start of the dryer system in November 2010. Thus the team was challenged to realize installation and startup during the harsh and snowy Canadian winter.

The start of commissioning in January was right on schedule, final acceptance was achieved in May 2011. "Not only a turnkey project but also under exceptional climate conditions and a very tight project schedule – for this 'premiere' there were several requirements that were well managed through our team," Dirk Koltze, sales manager North America, is glad to state.



"Right on schedule" during winter time

## Turnkey project by Buettner

## Buettner: profile

- Büttner Gesellschaft für Trocknungs und Umwelttechnik mbH
- Market presence: more than 135 years
- Production of over 2,000 dryers
- Scope of customers: Wood panel industry, sugar industry, pellet and chemical industry and other related industries
- Scope of supplies and services:
  - Planning of individual and turnkey dryer systems
  - Delivery of all major components
  - Manufacture of drums, ducts and cyclones close to the project location
  - Assembly
  - Check-out of complete installations
  - Start-up
  - Service



Drying only with waste heat! Premiere for an energy company





# Siempelkamp

G. Siempelkamp GmbH & Co. KG

## Machinery and Plants



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



**ATR**  
ATR Industrie-Elektronik GmbH



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



CMC S.r.l.



Hombak Maschinen- und Anlagenbau GmbH



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Machines & Handling  
W. Strothmann GmbH

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### Spain

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### Turkey

Siempelkamp Istanbul

### USA

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## Nuclear Technology



**Siempelkamp**  
Nukleartechnik

Siempelkamp Nukleartechnik GmbH



**Siempelkamp**  
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Assistance Nucléaire S.A.



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Siempelkamp Nuclear Technology Inc.



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## Foundry



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