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PRECAST CONCRETE PLANTS

THAI SCG GROUP INVESTS IN STATE-OF-THE-ART PRECAST CONCRETE PRODUCTION

Thailand has been experiencing a dynamic economic boom since the 70s. Even with the current political instability the demand for real estate continues unabated. The national construction industry in Thailand is aware of this and continues to invest in the latest technology for the production of precast concrete, such as the SCG Group.

In future, up to 2.2 million m² of solid precast elements per year will be produced in the vicinity of Bangkok. The SCG Group relies on the latest manufacturing technology for wall and concrete slabs in 1-A premium quality. Thus far known as one of the leading producers of cement in the ASEAN region, indicators predicted further growth and the development of more strategically and sustainable business segments in 2013. Vitas Suriyachan, On-site Manager at SCG Cement, explains the situation at the outset, "Precast construction technology was uncharted territory for us."

2.2 MILLION m² SOLID PRECAST ELEMENTS FOR NEW RESIDENTIAL PROPERTY

"Real estate developers are increasingly opening up the suburban areas and communities outside Bangkok with new construction projects," says Steffen Schmitt, Executive Sales Director Asia at Vollert. In view of a capacity of more than 2.2 million m² of solid elements annually, SCG decided to build new advanced precast production plants for concrete walls and slabs in the north and southeast of Bangkok on the "green fields" of the strategically important cities of Saraburi Nongkae and Chonburi. The integrated technology platform of the Vollert systems forms the core. CAD/BIM (Building Information Modelling) software for designing buildings provides the basic data. Thus choices become available as to the distribution of capacities to the two sites in regard to orders.

"We back solid elements with a thickness of 98 mm," says Vitas Suriyachan. "We are achieving this by means of a fixed side rail. Various thicknesses up to 178 mm can be achieved in phases via an additional attachment. The circulating pallets travel from shuttering and reinforcement operation to the concrete distribution site on transportation lines, which are arranged in parallel" Schmitt adds, "This plant concept enables us to achieve very high output volumes in the SCG plants. Here, we rely on the latest machinery standards." A magazining robot with twin grippers for the simultaneous process of storing and retrieving takes the shuttering profiles from the conveyor belt and straight to the next shuttering operation. A SMART SET shuttering robot with high performance data in speed and movement acceleration positions the shuttering profiles with high precision onto the arranged pallet in the next working process. Pre-plotting of contours and the positioning of the shuttering systems are CAD/CAM-controlled. Concrete spreaders moving in parallel feed the two concrete distribution lines in extremely short clock cycles. Concrete distribution cycles of 15 minutes per line are thus achieved for complex solid elements. Concrete compaction is done by means of a low-frequency SMART COMPACT² vibration station. The shaking movement generated by four unbalanced rotors thus consolidates the concrete. By lowering the ratio of the water-cement mix (W/C ratio), the quantity of cement can be cut down significantly. "Parallel arranged trowelling tracks ensure the consistently high quality of the exposed concrete," Vitas Suriyachan explains. As many as four concrete finishing trowels in bridge design travel in longitudinal and transverse directions on the transport lines and ensure that the surfaces of the solid elements have a smooth finish. The overhead controlled VArio STORE automatic storage and retrieval machine finally carries out the fully automatic storage and retrieval of pallets in and out of the four isolated curing chambers.

State-of-the-art technology and efficient processes in the new precast plant at SCG in Saraburi Nongkae

Vitas Suriyachan recaps, "We have reached an important milestone with this new plant technology in a very short time, from a mere cement producer to a supplier of building materials."

DEAR READER,

I am very pleased to present to you today our customer magazine in a new look and with a clearer structure of contents. We continue to always develop our machinery and equipment with the purpose of creating added value for our customers. In a similar manner we would like to keep our dialogue with you vibrant and up-to-date.

At the upcoming bauma 2016, without doubt the world's leading trade fair for construction machinery and building materials, we will show again key innovations and new market trends. We will present to you exclusively the new ISO-MATIC 2.0, current modernization projects and special mould systems, among some other topics. Interesting new plant projects are happening in the Asian region. Thailand's SCG Group is going to produce annually up to 2.2 million m^2 of solid concrete parts in the area of Bangkok. Read more about it in this issue. You will also find out more about why modern crane systems are real production accelerators. Impressive project examples from Europe and China show that for over 50 years we have been shifting our logistic processes to higher dimensions.

Show us your requirements and we are looking forward to a solution for them.

Yours
Hans-Jörg Vollert

CLEAR & BRIEF

INTRALOGISTICS SYSTEMS

WARNING! HEAVY HAULAGE!

Faymonville is one of the worlwide leading manufacturers of loaders for special transports

In Luxembourg the manufacturer of low-loaders, Faymonville, has parts that weigh up to 12 tons floating freely through its paintshop without touching the ground. At its headquarters in Lentzweiler in Luxembourg a new paint line for surface coating of trailer parts is currently under construction. The parts are blasted floor-free, spray-galvanized and coated. The material flow concept comes from a heavy haulage expert, too – from Vollert.

The focus is on the overhead dual-track suspension system. The distribution on two tracks allows the flexible and optimal positioning for automatic sandblasting of the workpieces, which may be up to 3.2 m high, 2.1 m wide and 13 m long. The process of sand-blasting and the drive through the cabin are fully automated. Only the item carrier is inside the cabin – the suspended running track and the friction wheel gear are outside and thus protected against contamination from the blasting abrasives. After a cleaning process the galvanizing spraying and priming procedures follow gradually, and then painting and drying of the workpieces. A semi-automatic distribution manipulator connects the parallel-arranged work centres and takes the workpiece to the 55 m long return line at the end of the cooling process.

Parts that weigh up to 12 tons are floating freely through the paintshop without touching the ground

SHUNTING SYSTEMS

NEW COKE UNLOADING PLANT AT VOESTALPINE

In early November 2015 voestalpine's new coke unloading plant was inaugurated in Leoben/Donawitz in Austria. voestalpine, Innofreight and the Rail Cargo Group have jointly developed the loading system which will revolutionize the raw material logistics at this site. The new unloading station allows a 100% delivery of raw materials by rail. A central component is Vollert's shunting robot KR 100, which pulls the loaded carts through the unloading station. The new plant technology will not only conserve resources and increase efficiency in Donawitz, but has also added value to the site and the region.

New coke unloading plant at voestalpine in Leoben

ON OUR OWN BEHALF

VOLLERT CERTIFIED

Besides general machinery and plant engineering and rail vehicle construction Vollert is a qualified expert in a third discipline. On 01/12/2015 the certification as steel constructor according to EN 1090-1 System 2+ was granted. This entitles us to manufacture structural steel products under EN 1090-2, regulated by the building authorities, to issue a declaration of performance and put equipment and machinery with a CE sign on the market.

PRECAST CONCRETE PLANTS

ALL IN PRECAST – BAUMA 2016

Under the theme "All in Precast", Vollert will be presenting new plant and machine concepts for stationary and fully automated production of precast concrete elements from April 11 to April 17 at the bauma 2016 in Munich (hall B1, booth 206). Taking centre stage is the award-winning and further improved ISO-MATIC 2.0, among others, which cuts insulating material to exact specifications fully automatically. A CAD-/CAM-controlled 6-axis cutting robot equipped with a water jet cutting head contours the material using 4,000 bar water pressure and a high positional repeatability.

But modernization projects are also a major topic. Manufacturers of precast concrete parts are focusing on upgrading and retrofitting existing plant technology to modern production standards in order to counter the growing competition for customers. Shuttering robots, automatic concrete spreaders and high-performance turning devices have revolutionised manufacturing processes and increased profits. For higher output capacities and a more precise positioning of the shutter systems, the gripper system of the shuttering robot, which was installed at Rector Lesage in Berre L'Etang in 2006, has now been replaced and a magazining robot complemented. The new gripper operates at a much higher level of accuracy when plotting contours and positioning shuttering systems.

ISO-MATIC 2.0 in action

EVENTS IN 2016

BAUMA 2016
Munich, Germany
11/04 – 17/04/2016

PAINTEXPO 2016
Karlsruhe, Germany
19/04 – 22/04/2016

YAPI – TURKEYBUILD ISTANBUL 2016
Istanbul, Turkey
10/05 – 14/05/2016

CTT 2016
Moscow, Russia
31/05 – 04/06/2016

CONCRETE SHOW LATIN AMERICA 2016
Sao Paulo, Brazil
24/08 – 26/08/2016

CONCRETE SHOW SOUTH EAST ASIA 2016
Jakarta, Indonesia
14/09 – 16/09/2016

INNOTRANS 2016
Berlin, Germany
20/09 – 23/09/2016

BIG 5/MEC 2016
Dubai, United Arab Emirates
21/11/ – 24/11/2016

PRECAST CONCRETE PLANTS

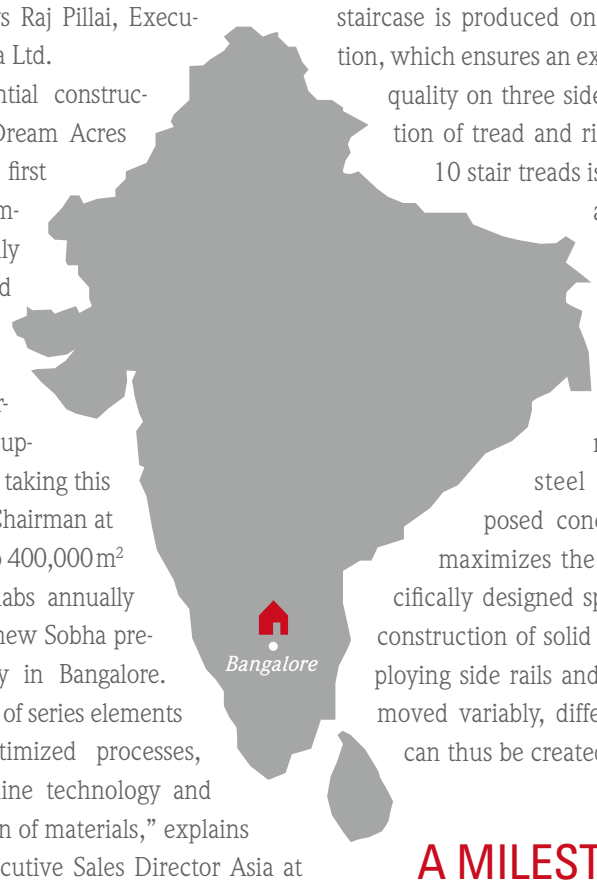
ADVANCED SPECIAL MOULD SYSTEMS FOR INDIA

Bangalore's Sobha Ltd. is among the leading and fastest-growing property developers in India with more than 360 construction projects completed. Founded in 1995, Sobha today is a 350,000 million Euro heavyweight and key player in the Indian real estate sector. The next milestone in the company's history is taking shape with the installation of its own precast concrete production facilities.

Besides solutions for walls and floors, Sobha will provide integrated solutions for modern residential and industrial constructions from now on

For years, the Indian construction sector has been enjoying steady growth. In order to establish much needed residential buildings at short notice, the national construction industry is banking in particular on precast construction technology as an alternative to conventional construction systems. It is regarded as a low-cost alternative that at the same time offers better build quality due to the industrialized production process. "Also, construction projects are completed in much shorter time than previously," says Raj Pillai, Executive Director of Sobha Ltd.

The residential construction project Sobha Dream Acres near Bangalore is the first construction project implemented that is fully based on prefabricated elements. "The immense know how of Vollert as the expertise and technology supplier has helped us in taking this step," Ravi Menon, Chairman at Sobha, explains. Up to 400,000 m² of plane wall and slabs annually are produced in the new Sobha precast concrete factory in Bangalore. "The output quantity of series elements is achieved by optimized processes, state-of-the-art machine technology and the optimal utilization of materials," explains Steffen Schmitt, Executive Sales Director Asia at Vollert. In addition to this, since July 2015, complex special elements and structural precast elements have been produced in the Bangalore facility. To ensure very high cycle times throughout the entire production process, these special parts are produced using stationary mould technology from the formwork specialist Nuspl. "Through Nuspl, part of the Vollert group since 2012, we offer customers the most advanced manufacturing processes for complex and structural precast concrete parts. At Sobha we have developed a space-optimizing solution for stationary mould technology and a state-of-the-art solid wall circulation system by means of 3D simulations.



STATIONARY MOULD TECHNOLOGY FOR SPECIAL ELEMENTS

Besides solutions for walls and floors, Sobha will thus provide integrated solutions for modern residential and industrial constructions from now on. Precast staircases are in particular among them. Nuspl supplies the adjustable straight stair moulds needed. With the VARIOSTEP stair mould the staircase is produced on its side in vertical position, which ensures an excellent exposed concrete quality on three sides. Any desired combination of tread and riser dimensions for up to 10 stair treads is available. Other stationary moulds create mouldings projecting from the wall which are used as sun protection in the Sobha building system. The surface is made of 8 mm, sanded steel sheets for premium exposed concrete surfaces. This also maximizes the long-term stability. Specifically designed special moulds enable the construction of solid walls in L-shape. By employing side rails and adapters, which can be moved variably, different L-shape geometrics can thus be created.

A MILESTONE IN THE INDIAN CONSTRUCTION INDUSTRY

"With the new precast production facility in Bangalore, where we have produced solid concrete parts and special elements for our projects since July 2015, we have set a real milestone for India in terms of component quality and plant productivity," says Raj Pillai. "Preset schedules for construction projects starting from an architect's first pencil stroke, and industrially controlled processes within the production of precast concrete secure the consistent supply of precast concrete parts for construction projects."

PRECAST CONCRETE PLANTS

MODERNISATION AS REPLY TO BUILDING TRENDS AND COST PRESSURE

In modern architecture shapes, colours and surfaces are becoming more and more versatile. At the same time, the capacities for new construction projects are bigger and cost pressures are rising. Machine technology and processes used in the production of precast concrete must follow these trends. Retrofit – the modernisation or upgrade of an existing plant technology – is the slogan.

The industrial manufacturing equipment of many precast concrete plants dates back to the 80s and 90s and thus is based on the level of knowledge of the fresh emerging precast sector of that time. Today, architecturally demanding projects and high capacities for larger construction projects require new production standards. The producers of precast concrete are responding and are investing in new machine technology, or are shifting away from manual processes to greater automation.

OPTIMISING OF SHUTTERING AND CONCRETE DISTRIBUTION

The Rector Group with its capacity of covering annually more than 3.5 million m² of walls and floors is one of Europe's "Big Players" in precast concrete production. Within the scope of comprehensive retrofit projects Rector already responded to the latest trends in the construction industry in 2013 by investing in its precast concrete plants in Courcelles-sur-Seine and Weyersheim. In 2015 another modernisation project in Berre L'Etang was carried out. For higher output capacities and a more precise positioning of the shutter systems the gripper system of the shuttering robot, which was installed at Rector Lesage in Berre L'Etang in 2006, has now been replaced. The new gripper works with significantly higher precision in plotting contours and positioning of the shuttering systems. It also features a new type of collision monitoring of the X, Y and Z axes. The additionally newly installed magazining robot takes the shuttering systems after the demoulding and cleaning processes straight from the mould identification line and puts them on a roller conveyor feed.

At LFT Lindermayr in Friedberg the entire concrete distribution process underwent retrofitting in the beginning of 2016 and the concrete spreader installed in 1988 was replaced with an ultra-modern automatic concrete spreader. The machine control was developed accordingly in order to accommodate the new technology in the master control system. For every concrete distribution process the optimal traversing programme is created and delivered by means of a CAD/CAM interface. The concrete measuring is done via a hydraulic worm gear handling unit, whereby in automatic mode the worm gear drives are controlled individually or in groups. The amount of concrete output is always recorded and monitored. The longitudinal and transverse travel readings are carried out by means of an intelligent laser system.

EFFICIENT DOUBLE WALL PRODUCTION

The concrete factory Oschatz, a manufacturer of upmarket precast concrete parts for industrial and commercial buildings for 25 years, has recently upgraded its double wall production subdivision. Centre stage: the new stationary vacuum turning equipment. "We partially produce very complex precast elements with different geometrics or large cut-outs and planks. The objective for replacing the vacuum turning equipment was to achieve significantly more economical processes in the production of smooth formwork on both sides of double and zero walls," as the Managing Directors Birgit Zocher and Matthias Schurig describe. The newly installed vacuum technology provides greater retention power, which also makes it possible to manufacture extremely differently sized wall panels on the turning frame, in addition to greater output figures. Automation technology has been extensively modernised and adapted to the new technology. 168 suction cups ensure that the semi-finished concrete parts are retained securely on the vacuum turning frame during any lifting and rotating movement. Payloads of up to 10 tons are thus achieved. The turning operation is done safely within a period of about 30 seconds.

A SUSTAINABLE TREND

Precast concrete manufacturers are going to invest even more in existing equipment technology.

State-of-the-art vacuum turning equipment provides more profitability in double wall production processes

"The examples show that by the implementation of the latest machine technology short-term cost saving potentials can be achieved. With our modernization programme we offer precast concrete manufacturers an effective response to the current construction trends and the growing pressure of costs," explains Björn Brandt, Vice President at Vollert.

INTRALOGISTICS SYSTEMS

CRANES WITH TACT AND FINESSE

Crane systems today are the backbone of many production processes. Their versatility is hard to outperform. They suck, grab, lift, turn, weigh, scan and drive in one go and they also transport heavy loads effortlessly. Different plant control systems – manual, semi- or fully automatic – optimize the interaction between human and machine.

The AMAG Austria Metall AG, Austria's leading manufacturer of aluminium products, was confronted with a special task. The traditional company makes very diverse aluminium plates and strips in a newly built hot rolling plant. The aluminium plates are between 4 m and 12.5 m long weighing up to 8.5 tons. For the purpose of pre-packaging they are assembled in different packaging lots – a perfect task for a crane. When restacking, a 3-axis manipulator from intralogistics specialist Vollert which is equipped with bridge, lift and trolley gear, grabs three to four storage pallets of aluminium plates and stacks them on two heavy duty pallets – fast, easy, automatic.

This example shows that a crane is hardly ever a mere rope with a hook. Modern crane systems will move the most diverse workpieces – whether in metal, aluminium or automotive industries, in mechanical engineering or the production of precast concrete. Vital for the gripping systems is an individual and intelligent design. They will automatically accommodate workpieces that vary in size. At AMAG a vacuum suction truss picks up the aluminium plates. The system controller identifies the length of the material and turns the necessary vacuum cups automatically on or off. To this end, the control system communicates with the AMAG warehouse management system.

INTELLIGENT GRIPPING SYSTEMS FOR INGOTS, COILS AND SO ON

Challenges of a different nature arise when transporting 35 tons of heavy aluminium ingots. Engineering systems that accept loads come in different customized designs and can sandwich the workpiece by its sides by means of hydraulic grippers and also grab it from underneath without causing any damage. Also intense heat up to 580 °C should not be an obstacle when it comes to transportation. The Chinese city of Tianjin is home to the new mega-plants of the Zhongwang Group, one of the world's largest manufacturers of high-quality aluminium products, where a total of 16 automatic cranes and manipulators equipped with the Vollert technology serve several on-floor stores and connect the processing areas by crane tracks of up to 500 m in length. The cranes are designed as 2-girder bridge cranes, with span widths of up to 31.5 m, and stack and unstack heavyweight aluminium ingots fully automatically – up to five on top of each other. Four gripper jaws grab the ingots by the sides and lock by means of hydraulic pressure. However, when lifting aluminium coils of different diameters, the gripping systems are equipped with an automatic coil-eye detection, which guides the gripper safely to the coil.

DRIVING WITH FOURFOLD WALKING SPEED

At Zhongwang high travel speeds along with high positioning accuracy and repeatability are important due to the spacious on-floor storage. The automatic cranes at Zhongwang move at 4 m/s, which is about 14 km/h – that is, four times walking speed. Even with the spacious on-floor storage, the positioning precision is only +/– 3 mm. Yet, fully automated processes are not always possible or even the most economical solution. In the interaction of "human and machine" semi-automatic crane systems often provide the optimal solution. At Hydro Aluminium in Grevenbroich for instance, a semi-automatic machine control supports the processes of loading and unloading trucks involving tons of aluminium coils. Here the automatic contour control allows damage-free loading of coils of different lengths. As is the case with most human-machine interfaces, the crane runs fully automatically up to a predefined handover point. From then on further processes are manually monitored and acknowledged for safety reasons; the loading and unloading process itself however is supported by the automatic crane system.

THE CONQUEST OF THE AIRSPACE IN PRODUCTION

Whether manual, semi-automatic or fully automatic, modern crane systems conquer the third dimension through their use of air space, and in either case interlink the production processes quickly and reliably. Their versatility is matchless. They are also space-savers and integrate into all buildings and any space condition, while creating more free space at ground level. All of that explains why they are real production accelerators.

16 automatic cranes and manipulators equipped with the Vollert technology serve several onfloor stores and connect the processing areas

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