

PRESS RELEASE

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Chinese Baoye Group continues to invest in precast concrete production

The Chinese Baoye Group has built yet another precast concrete plant in Quzhou, 800 km southwest of Shanghai. Baoye will produce double walls and floor slabs of up to 700,000 square meters per year for mega-residential projects. At the heart is the latest plant technology from Vollert, a concrete plant specialist, while the focus is put on China's hot topics, resource efficiency and environmental protection and prefab architecture as a sustainable building system.

Back in 2016, the Baoye Group developed one of China's first and most advanced precast concrete plants in Qingpu, a district west of Shanghai. "The criteria we employed like meticulous pre-design planning and bringing the plant concept and the highly automated machine technology in harmony with the building system, were crucial for the success we enjoy today and the reason that we are able to supply our huge construction projects in this metropolitan area with precast concrete parts," says Hua Fan, General Manager of the Baoye Group. The Baoye Group is one of China's leading state-owned construction companies. In recent years the architects of Baoye developed the Golden Eagle Tiandi Square in Nanjing, the 330-meter-high Zhuhai Center and the tower of Kuwait Central Bank's headquarter, which are classified as real architectural highlights.

New housing projects for China's booming cities

Affordable housing is also in demand on the outskirts of the booming cities of Shanghai and Beijing and in other growing metropolitan areas in China. 83 cities in China feature already a population density of more than one million residents, 10 cities have a population of 5 million each. Residential districts and entirely new neighborhoods are emerging, including multifunctional shopping malls, hospitals, hotel compounds, universities and schools. Also, in China, prefab architecture is the preferred construction method today. Prefab architecture features excellent energy efficiency and high weather resistance while constantly complying with high construction standards and, compared to conventional building systems, construction costs are lower and construction times significantly shorter. "Precast concrete parts will reduce the construction costs in China by 10 - 15% and will produce urgently needed residential properties," explains Björn Brandt, Vollert's Vice President, the reasons why industrially precast concrete elements have clearly gained momentum and much appreciation in China over the past 2-3 years.

Vast residential construction projects are currently being pre-designed nationwide, including 800 km southwest of Shanghai in the strategically important region of Quzhou in the west of the Zhejiang province. "Short distances are crucial for a best possible construction site management. Since 2016 we are successfully producing precast concrete parts for Shanghai's metropolitan area in Qingpu. So, a year later we decided to increase our capacities even more. Therefore, we have built another precast concrete plant that will supply the housing projects in the Quzhou region in the future," explains Baoye's Hua Fan. The new plant location is set to produce annually up to 500,000 sqm of floor slabs and 200,000 sqm of double walls for use in construction projects. Just as in 2016, they once again counted on the expertise of Vollert as supplier of technology and systems. "A plant concept adapted to the building system, state-of-the-art engineering technology and integrated data flows from the architect's first 3D models to the installation of concrete slabs at the construction site, that is what makes a precast concrete plant successful today. This requires the know-how of experts. And that is what Vollert delivers," says Hua Fan.

Industrial pre-production of concrete parts for optimal processes at the construction site

The first walls and slabs in Quzhou were shipped to construction products in the region in May 2018, roughly 10 months after the civil engineers and planners at Vollert had finished pre-design planning. Up to 60 circulation pallets with an 80 mm high formwork fixed on both sides are always present between the individual workstations and the storage areas. Highly automated engineering technology ensures maximum system productivity and a consistently high-quality level of the precast concrete parts. The intelligent MES production and warehouse control system of the automation specialist RIB SAA Software Engineering optimally synchronizes the walls and slabs in chronological order as per job processing list during production, manages storage and retrieval sequences and also curing times and loading processes.

State-of-the-art engineering technology ensures streamlined and highly productive operating procedures. Precise high-performance robots, turning and transport equipment, and fully automated timing of all processes including transport routes deliver the ever-increasing level of automation in the precast concrete plant. This is not only important in terms of plant productivity. It also ensures consistently high-quality standards and less concrete and material rejects, hence higher resource efficiency. "Moreover, Baoye is thus able to always supply its mega-construction projects on time," adds Björn Brandt. "Highly

automated SMART SET shuttering and de-shuttering robots are having a key role here. The shuttering profiles are positioned precisely and fixed at high speeds by means of magnets. This is CAD/CAM controlled just like the contour plot. The shuttering elements and installation parts will be set up manually later on. Demolding by means of robotic technology will increase the life of the shuttering systems and reduces the cycle time per circulation pallet. A 3D laser system scans the surface of the circulation pallet and compares the instant result with the specifications from the pallet allocation plan. The reinforcing lattice and possible special components are then placed on parallel arranged transport lines. Depending on the construction project and the level of capacity, preparatory work for the structural elements or upper and lower shells of the double walls can thus be carried out simultaneously. Downtimes or waiting times are minimized, which considerably improves plant productivity.

Sustainable market success for precast concrete plants through technology edge

Today innovative concreting and curing processes optimize the processes in the modern precast concrete plant and ensure better construction standards. "We always refer to this technological edge which is of real competitive advantage for our customers," says Hans-Jörg Vollert, CEO at Vollert. Besides the swift construction progress the Baoye Group was particularly interested in the quality of exposed concrete. The concrete is compacted by means of a low-frequency SMART COMPACT² compaction station. The result is a smooth surface and an optimal compaction of the extra reinforced shell of the double wall for additional support. Prior to this, a SMART CAST automatic concrete spreader applies precisely the exact preset amount of concrete by means of an optimized batch program. Isolated, steam-heated curing chambers ensure controlled curing of the concrete. The rack towers with 16 shelves each are controlled by means of a centrally installed, floor-guided VArio STORE storage retrieval machine. Up to 60 slabs and double walls can be stored here together.

In addition, turning operations in double wall production have seen important technical innovations. Hydraulic clamps lock the circulation pallet in the traverse of the ceiling-guided pallet turning device until the upper shell is pneumatically locked by means of a specially developed clamping arm system. The height fixation of the clamping arms is variable, so that secure clamping is ensured as the insulation for core-insulated twin walls no longer poses an obstacle. Following the turning process and the immersion of the first shell's lattice girders in the fresh concrete of the second shell, the twin wall is formed by synchronously shaking the two shells without relative motion. The twin walls are vertically lifting by a VArio

TILT high-performance tilting station. The hydraulically operated support bar travels towards the fixed modular formwork to prevent the concrete slab from shifting out of place during the tilting process. SMART LOGISTIC extended-length pallet trucks connect the loading area with the spacious outer storage areas. From there, the storage racks are transported on a travel length of more than 100 m to the final loading position by means of a central transfer table.

On track for more growth

"The precast plant in Quzhou is set to soon supply the next mega construction projects in this region," says Hua Fan. In retrospect, the decision to choose Vollert as a technology and plant supplier was the right step and an important one. "At first glance the costs of investment seem to be higher compared to the Asian suppliers on the market. But ultimately, plant productivity and profitability figures count. And those are clearly favorable in regards to the investment technology 'made in Germany'. Plus, we have got a building system that is sustainable and environmentally friendly," says Hua Fan. "Prefab architecture has finally gained acceptance in China."

About Vollert Anlagenbau GmbH

Founded in 1925, Vollert Anlagenbau GmbH has built over 370 precast concrete element plants and established a network of subsidiary companies in Asia and South America to become an industry leader in technology and innovation in the precast concrete element industry. Vollert always offers its customers state-of-the-art technology, from simple start-up concepts to highly automated multifunctional plants and systems for large and structural concrete elements or prestressed concrete sleepers for tracks and rail networks.

The specialists provide manufacturers of construction materials, construction companies, and property developers with advice on the latest developments in precast concrete element manufacturing technology and devise customized, turn-key plant and machine concepts, ranging from high-performance tilting stations and battery moulds for stationary production to automated circulation systems and special formwork, for example, for supports, binders, and prefabricated staircases. The company employs some 270 personnel at its headquarters in Weinsberg. **www.vollert.de**

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Image 1
The new precast concrete production line in Quzhou will increase the capacities of the Baoye Group by 700,000 m² of wall and slab elements per year.



Image 2
Highly automated SMART SET shuttering and de-shuttering robots play a crucial role in terms of in plant productivity.



Image 3

Shutter profiles are stored in the magazine after cleaning by means of transverse conveyors.



Image 4

A 3D laser system scans the surface of the circulation pallet and compares the instant result with the CAD/CAM specifications of the pallet allocation plan.



Image 5

Precise concrete application with the SMART CAST automatic concrete spreader.



Image 6

The MES production and storage control system controls and analyzes all workstations and plant processes.



Image 7

The heated rack towers of the curing chamber are controlled via the VARIO STORE storage and retrieval machine.



Image 8

The state-of-the-art ceiling-guided VARIO TURN pallet turning device is used in twin wall production.



Image 9

SMART LOGISTIC extended-length pallet trucks connect the loading area with the spacious outer storage areas.