

# SOLUTIONS FOR PRECAST CONCRETE PRODUCTION

**Vollert** 

 MADE IN GERMANY  
**ENGINEERING  
YOUR  
SUCCESS**



PRECAST CONCRETE PRODUCTION

# OVER 90 YEARS OF INNOVATION AND KNOW-HOW

Vollert is the leading expert partner for concrete works, construction companies and property developers when it comes to modern precast concrete production. The passion to produce intelligently designed plant and machinery concepts, which are optimally tailored for you, drives us every day.



**ALL IN PRECAST,  
PRECAST ALL IN**

*Why our customers are  
so successful, you will  
see here.*

## NEW CONCEPTS FOR THE CITIES OF TOMORROW

Modern precast concrete architecture is changing construction methods around the world. New residential and office space is being created for the growing megacities in Asia, South America and the rest of the world. Nowadays, multifunctional shopping malls, hospitals, hotel resorts, universities, schools and logistics centres are being built with resource-saving precast concrete elements. But we are also your trusted expert partner for infrastructure projects such as bridge beams or noise barriers for new city districts.

We offer solutions for the industrial prefabrication of walls, slabs, beams or special components, from state-of-the-art formwork systems, start-up concepts to highly automated precast concrete plants with capacities of several million square meters of concrete surface annually. Vollert technology ensures economic processes combined with an optimal level of automation. High-tec machines ensure efficient work processes – from CAD/CAM-controlled shuttering robots, through fully automated concrete

spreaders to innovative vacuum turning equipment for double wall production.

## MORE THAN 370 SUCCESSFUL PRECAST CONCRETE PLANTS

As pioneer and trendsetter, we developed the first industrial solutions for precast concrete production in the 1970s. Today we work together with our customers on new concepts for low-energy houses or earthquake-proof construction systems, and develop innovative plant concepts for this purpose. With modern machine technology, the integration of intelligent BIM software and our system solutions for cost-effective control and evaluation of your precast concrete production, you will receive a solution that will ensure your success over the long term. Just like the more than 370 precast concrete plants that we have already completed in every continent of the world.



**Björn Brandt**

Vice President  
Precast Concrete Plants

**Hans-Jörg Vollert**

CEO

# PRECAST CONCRETE ARCHITECTURE SETS THE TREND WORLDWIDE

The precast building system is state-of-the-art and setting trends worldwide. From the latest designs of single-family homes and multifunctional residential and office complexes through to logistics centres and multi-storey car parks, it is shaping urban architecture all over the world.



## CREATING SPACE WITH CONCRETE

Precast concrete architecture is today's leading construction method. It not only guarantees high-quality construction and lower construction costs, compared to conventional building systems, but also shortens construction times significantly. Fixed schedules for construction projects and industrially controlled processes in precast concrete production ensure a reliable construction progress in much shorter periods compared to former construction methods.

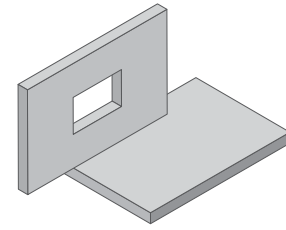
The modern precast construction system simultaneously achieves very good energy efficiency ratings, a high weather and fire resistance, and also makes building projects in earthquake zones possible. In addition, the CO<sub>2</sub> footprint can be reduced by 25% and water consumption by 50%, compared to the former monolithic building system.



- 1 Moonlight office complex in Luxembourg City, Architect: Felix Giorgetti
- 2 Industrial park Munich, Architect: Architects Hild und K (source: decoma)
- 3 Ministry of the Interior, Kingdom Relations/Ministry of Security & Justice, The Hague, Architect: Prof. Hans Kollhoff Architects (source: decoma)
- 4 Earthquake-resistant city villas in Chile

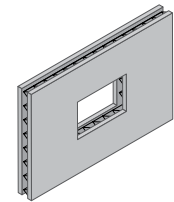
# THE BASIC DECISIONS IN PRECAST CONCRETE PRODUCTION

The choice of the right construction system is decisive for the future design of the production plant. In making this choice, a wide variety of criteria have to be considered, such as climate, the seismic hazard, the labour market, commodity prices or country-specific regulations such as taxes and regulations.



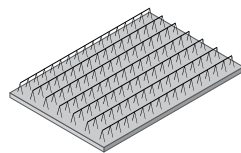
## 1. Solid walls and slabs

Solid walls and slabs consist of 10 - 40 cm thick solid concrete elements made of normal or lightweight concrete and built-in structural reinforcement and are often used for basement walls and for ground and upper-floor walls (load bearing or non load bearing). In situ concrete is not needed; large precast elements guarantee rapid construction progress.



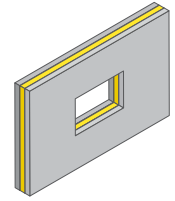
## 3. Double walls

The double wall consists of concrete slabs with a thickness of 5 - 7 cm each, which are held together by a truss-type reinforcement. After installation, the remaining void is filled with in situ concrete – creating a monolithic, dense and extremely solid concrete element.



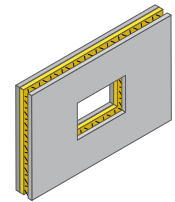
## 5. Floor slabs

The floor slab is a reinforced concrete slab with a thickness of 5 - 7 cm, depending on the concrete cover and amount of reinforcement. The torsionally stiff reinforcement required for structural rigidity and the flexural tension reinforcement required lengthways and crossways are usually pre-installed. Additional in-situ concrete turns the floor slab into a solid reinforced concrete floor.



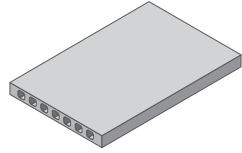
## 2. Sandwich walls

Sandwich walls have an insulating layer enclosed by concrete on both sides. The load-bearing shell, with the structural reinforcement, is on one side and the visible shell on the other.



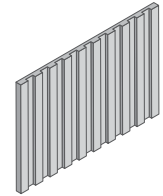
## 4. Double walls with insulation

Core-insulated double walls have insulation installed between the concrete slabs. This combination opens up new application possibilities and ensures high energy efficiency.



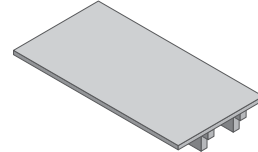
## 6. Hollow core slab

A novel manufacturing process makes it possible to produce prestressed hollow core slabs on pallets in a circulation system. This enables each hollow core slab to be produced to the required component geometry and dimensions without the need for cutting.



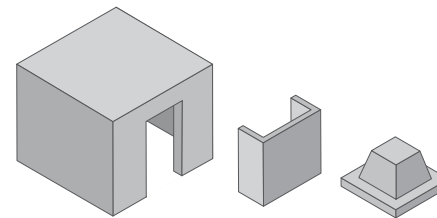
## 7. Façade elements

Façade elements are industrially produced solid walls that are characterised by a wide variety of surface designs. The range is enormous, extending from traditional exposed aggregate concrete surfaces to brick and matrix structures and marbled surfaces. The reinforcement for structural stiffness is pre-installed.



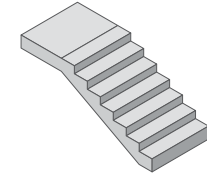
## 9. TT slabs

TT concrete slabs are used for high loads of 25 kN/m<sup>2</sup> and more, which is the case, for example, for wide-span floors/slabs in multi-storey car parks. These prestressed slabs can cope with spans up to 20 m with similar heights. Variants, with and without supplementary in-situ concrete, are possible.



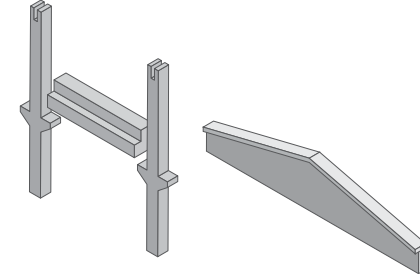
## 11. Special precast concrete parts

Special precast concrete parts are used today in modern infrastructure construction for such structures as bridge beams, sewers, tunnel shafts and noise barriers. But nowadays, special architectural components and room modules are also able to be prefabricated industrially.



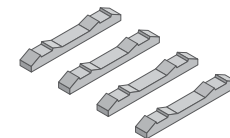
## 8. Stairs

Due to industrial prefabrication and the very short set-up and assembly times, precast stairs offer significant cost advantages, while simultaneously representing a high quality exposed concrete.



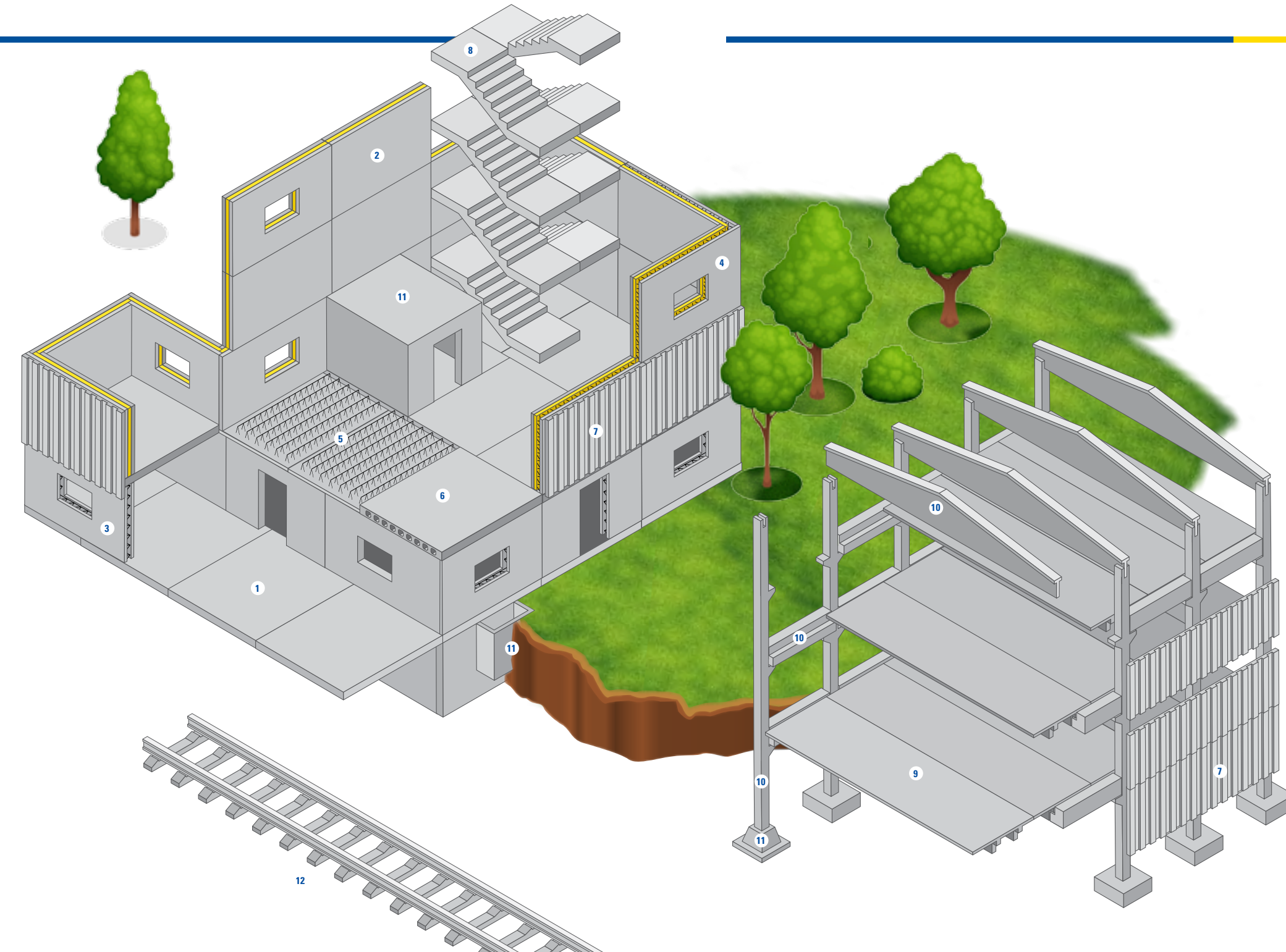
## 10. Columns and beams

These days, logistics centres, industrial halls or multi-storey car parks are being created with ever-increasing spans and side heights. Prestressed columns and beams are ideally suited for this.



## 12. Concrete sleepers

Nowadays, concrete sleepers are the standard in tracks in rail networks. As a material, concrete is durable and low-maintenance, as well as environmentally friendly. The railway sleepers are delivered completely ready for laying. For this, the entire reinforcement is installed and prestressed in accordance with the required standards.





## EXPERTISE, STATE-OF-THE-ART MACHINES AND INDUSTRY 4.0

### DESIGN MEETS DATA AND TIME

Close cooperation between the builder, planner and engineers is essential to achieve optimal time management on the construction site. To achieve this, architects and building contractors are working with up-to-date BIM (Building Information Modeling) technology as early on as the design phase. This ensures a transparent exchange of information between all participants in the construction project. Scalable model data of the necessary walls and slabs will later be created from the 3D CAD building data, which will be optimally scheduled in terms of production technology, using CAD/CAM control.



Whether a project requires solid and sandwich walls, floor slabs, beams or special concrete parts, our experts will work out an individually designed system concept for you using 3D visualization models. Modern system solutions, such as the Vollert Control Centre, control all processes in the production of precast concrete elements and provide you with an evaluation of the productivity of the production plant.

We turn your vision and ideas into reality. As a result, you are always able to produce the required capacities for the next construction projects.

To be successful today, a precast production plant needs a manufacturing concept adapted to the building system, state-of-the-art machine technology and integrated data flows from the architect's first 3D models to the installation of the concrete elements on the site. That demands the expertise of experts.

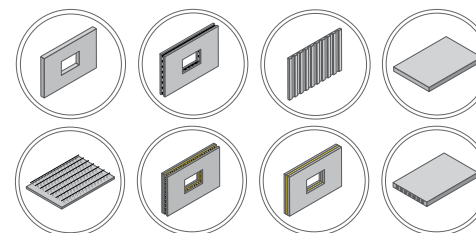


## CHOOSING THE RIGHT PRODUCTION SYSTEM CONCEPT

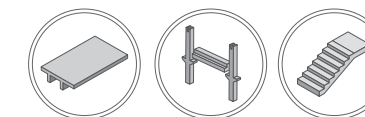
The right production system concept provides for long-term success – as is proven by many of our customers in Europe, Asia, America, Australia and the rest of the world. Regardless of whether you are new to precast construction or are already implementing mega construction projects, our experts will take you further and show you construction systems and the ideal system solutions for your requirements and associated conditions such as climate or raw material situation.



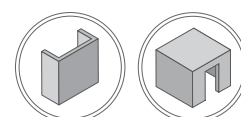
PRODUCTION SYSTEM CONCEPTS  
FOR WALL AND SLAB PRODUCTION



FORMWORK SYSTEMS FOR  
STRUCTURAL BUILDING ELEMENTS



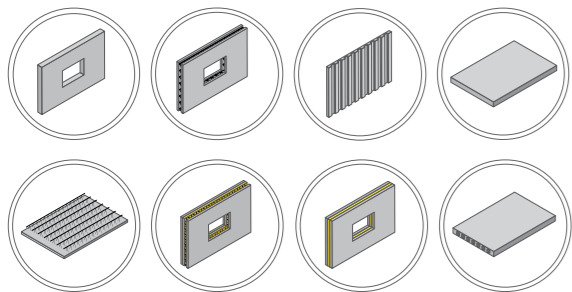
FORMWORK SYSTEMS FOR ROOM MODULES  
AND SPECIAL PRECAST ELEMENTS



SYSTEM CONCEPTS FOR  
CONCRETE SLEEPER PRODUCTION



# SYSTEM CONCEPTS FOR WALL AND SLAB PRODUCTION

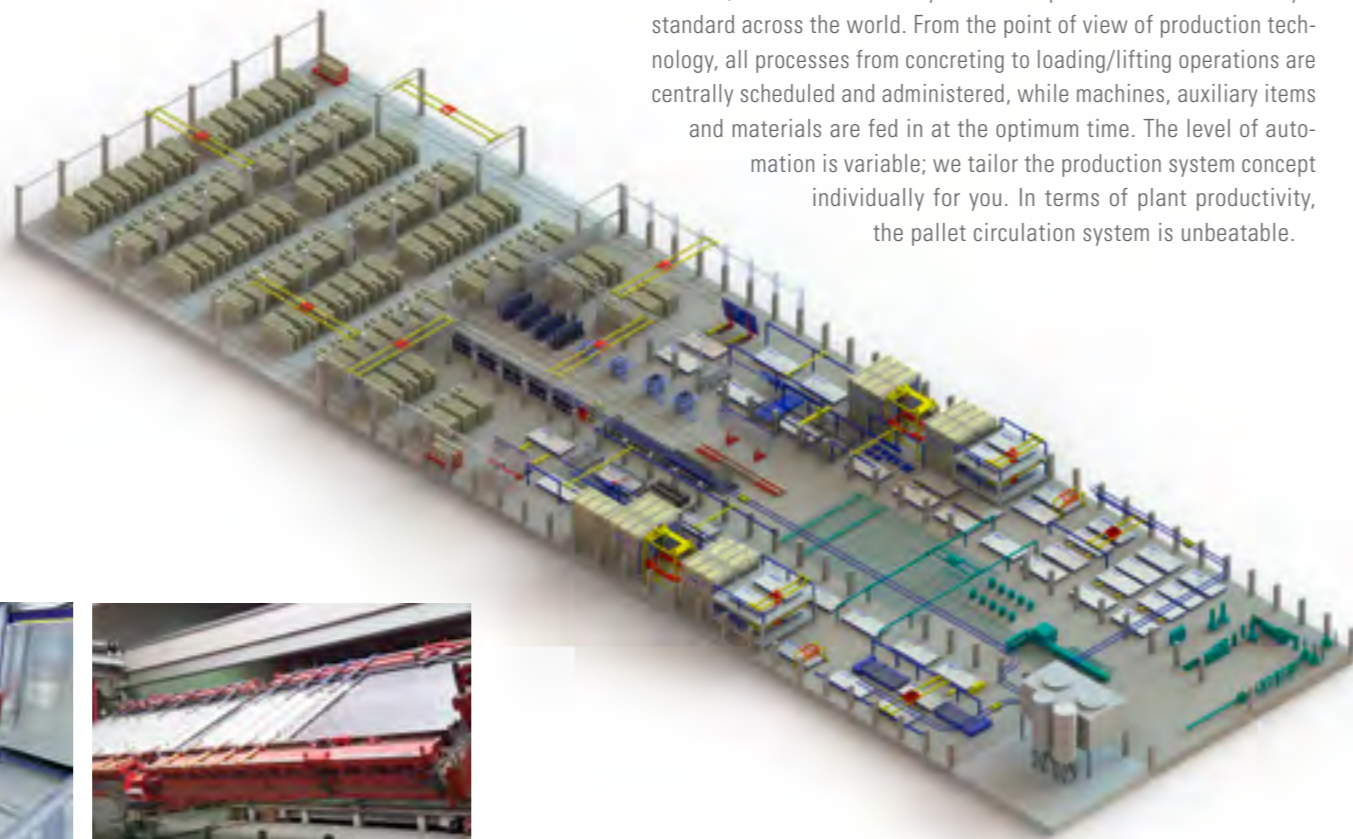


SMART SET shuttering robot

The industrial mass production of modern precast concrete elements shortens construction times significantly. Single-family homes, multi-storey office complexes or modern shopping malls are being built in just a few weeks. In addition, fluctuations in surface quality or wall thicknesses that frequently occur in conventional construction are virtually eliminated and the quality of construction is consistently high. This requires pre-planning with modern BIM technology and the latest plant and machine technology on the production side.

## THE PALLET CIRCULATION SYSTEM

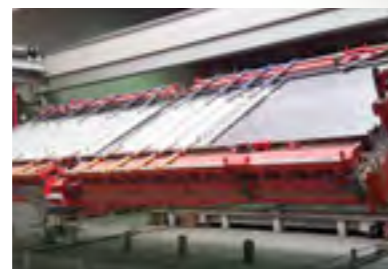
Flexible, circulation-based system concepts from Vollert set today's standard across the world. From the point of view of production technology, all processes from concreting to loading/lifting operations are centrally scheduled and administered, while machines, auxiliary items and materials are fed in at the optimum time. The level of automation is variable; we tailor the production system concept individually for you. In terms of plant productivity, the pallet circulation system is unbeatable.



SMART CAST concrete spreader



Vario STORE storage retrieval machine



Vario TURN turning equipment



## HIGH-TECH, ROBOTICS AND AUTOMATION

State-of-the-art machine technology ensures efficient work processes – from CAD/CAM-controlled shuttering robots to fully automated concrete spreaders and pallet turning equipment. Vollert technology guarantees economical processes combined with an optimal degree of automation. Innovations ensure more rational work stages, lower utilization of material and personnel and high quality finished parts.

In consultation with our clients, we jointly plan and build the precast concrete manufacturing plants of tomorrow, from simple, modularly expandable basic solutions to complex multi-functional plants producing several million square meters of concrete surface a year.



- 1 SMART CAST concrete spreader
- 2 SMART SET shuttering robot
- 3 ISO-MATIC working station

REFERENCE PROJECT

**CORDEEL, BELGIUM**

The Cordeel Group's building projects produce turnkey solutions for customers Europe-wide. Hundreds of construction projects, ranging from exclusive housing developments, mega-shopping malls and industrial buildings to hospitals and school buildings have sprung up in recent years. Precast solid, double and sandwich concrete elements are used for modern precast architecture. With its new precast concrete plant in Temse, Cordeel has now become one of the biggest key players in Europe.

OUTPUT



LEVEL OF AUTOMATION



INVESTMENT



For further information on this project and the construction system: [vollert.de](http://vollert.de)



- 1 Maximum system variability is important to Cordeel
- 2 ISO-MATIC 2.0 for the precise preparation of insulation material
- 3 Solid, double and sandwich concrete parts for own construction systems
- 4 Modern architecture is a special trademark of the Cordeel Group

REFERENCE PROJECT

**SCG GROUP, THAILAND**

In 2013, the Thai SCG Group decided to build state-of-the-art precast concrete production plants for wall and slab elements in the strategically important cities of Sarabury Nong Khae and Chonburi. Up to 2.2 million m<sup>2</sup> of solid concrete elements are produced annually for residential construction projects in the growing rural areas of Bangkok. The entire system concept is categorized by a very high level of automation and intelligent work and logistics processes.

OUTPUT



LEVEL OF AUTOMATION



INVESTMENT



Highly automated system technology in action, live: [youtu.be/OIHwCdrdJdE](http://youtu.be/OIHwCdrdJdE)



- 1 SCG production plant in Sarabury Nong Khae/Thailand
- 2 Modern urban villas are built
- 3 Precast concrete architecture with that certain something



REFERENCE PROJECT

**SOBHA, INDIA**

*Dream Acres is a residential project with 7,000 apartments in the heart of Bangalore. It is the first project in the Sobha Dream series. It stems from Sobha's vision of providing contemporary, high-quality housing for today's Indian families. Comprising 81 hectares of land with 80% green space and 500 exclusive, high-quality apartments with public facilities, the project is unique in India's history. Every year, Sobha produces 400,000 m² of walls, slabs, beams, columns and special concrete elements in its new precast concrete factory for Dream Acres.*

OUTPUT



LEVEL OF AUTOMATION



INVESTMENT



For further information on this project and the construction system: [vollert.de](http://vollert.de)



- 1 Modern production of solid elements at Sobha
- 2 State-of-the-art machine technology
- 3 Dream Acres residential project in the heart of Bangalore

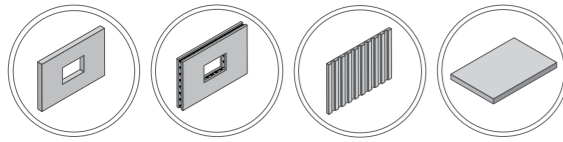


- 4 Formwork systems for concrete columns
- 5 Precast stairs for Dream Acres project
- 6 Specially designed concrete elements





# STATIONARY CONCEPTS FOR WALL AND SLAB PRODUCTION



## HIGH PERFORMANCE BATTERY MOULDS

High-performance battery moulds are ideal for the vertical production of single-layer, large-area wall and slab elements or other large-area precast concrete elements with mould-smooth surfaces on both sides. A large mould area is provided on a relatively small base area. Shuttering work is minimal and surface area utilization is maximized, which ensures high system productivity.

Optional integrated partitions in a chamber enables several concrete elements to be manufactured at the same time. The design makes for easy access to the open casting panels and demoulding. Opening and closing the chambers can be mechanical or electrical. Sophisticated hydraulics for tightening the individual casting panels as well as their own stable construction ensures that the hydrostatic pressure is absorbed during concreting. A sophisticated vibration system ensures effective compaction of the concrete.

Battery moulds are built in mono or duplex configurations. In the duplex version, the fixed centre casting panel is located between the moveable casting panels so that the relevant chamber sections can be filled independently. Alternatively, semi-mobile battery moulds can be provided if precast concrete production is required near to the construction site.

- 1 High-performance battery moulds ensure maximum system productivity*
- 2 Versatile building systems can be created by using battery moulds for walls and slabs*



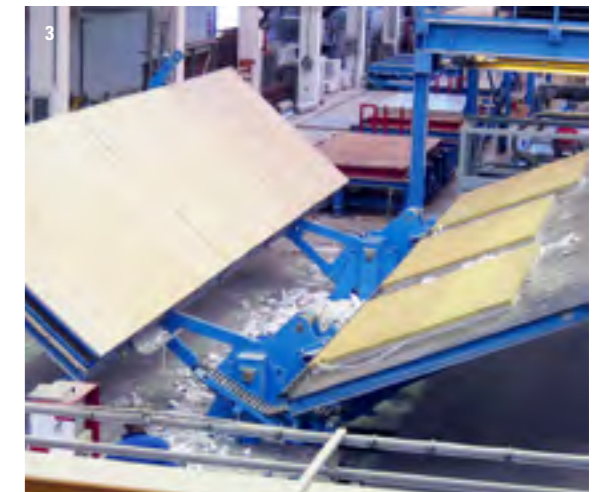
- 1 Tilting tables are versatile and an interesting start-up solution*
- 2 Present-day precast architecture is setting the standards in construction*
- 3 The multivariable flipping table*
- 4 Long-line beds and formwork tables for small quantities*



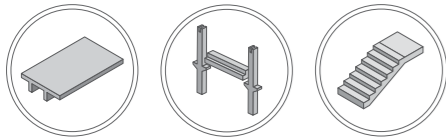
## TILTING AND FORMWORK TABLES, FLIPPING TABLES AND LONG-LINE BEDS

Tilting tables enable the flexible, horizontal production of wall/façade elements and plane special parts. Hydraulic tilting joints stand the mould surface upright and ensure lifting without chipping the edge of the concrete. First class exposed concrete surfaces are guaranteed by the plane-ground mould surface. Whether as version with fixed side rail, height adjustable side rail in the range of 120 – 350 mm or wooden shuttering with a height-adjustable support base – the construction is designed so flexibly that any number of wall heights can be manufactured. Torsion stiffness guarantees large-dimension construction.

Long-line beds or simple formwork tables are also suitable for the production of solid walls and slabs. These stationary solutions are also optimally suited for small quantity production or frequent mould changes. They are characterized by a low basic investment. An interesting first step into precast concrete production, especially in low-cost countries. A variation on the production line is the flipping table. It is used to produce a double wall as a supplementary product to a floor slab.



# FORMWORK SYSTEMS FOR STRUCTURAL CONCRETE ELEMENTS



## COLUMN, BEAM AND TT SLAB MOULDS

Vollert's hydraulically controlled beam moulds offer you flexible equipment options for the production of structural concrete components. These enable the production of standard or special profiles with different heights, I, T or TT cross-sections and the ability to convert to rectangular cross section or V purlin. Length is freely selectable, while beam heights are continuously adjustable over the 900 – 2,400 mm range, as is the upper flange width up to 900 mm.

Hydraulic column moulds also offer maximum flexibility. Heights of 400 – 1,200 mm and widths of 100 – 1,000 mm are possible as standard, and an op-

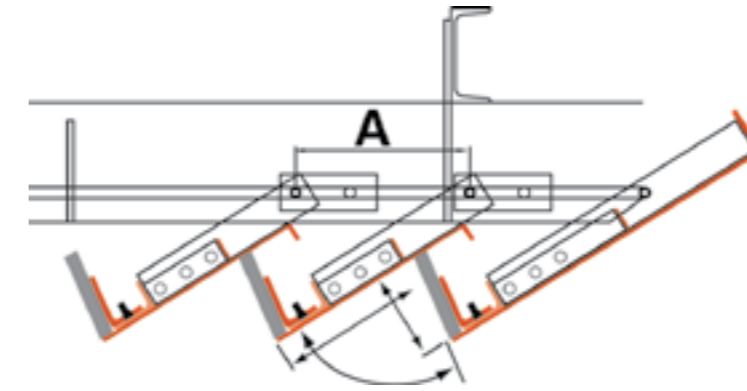
portional height and width extension can be undertaken at any time – whether as mono or duplex moulds.

Prestressed TT concrete slabs are often used for slabs with high spans. TT mould systems can be used to produce spans of up to 20 m, with or without the addition of in-situ concrete.



- 1 Multifunctional column mould
- 2 Hydraulic beam moulds for spans of up to 100 m
- 3 TT slabs are very popular today in the construction of industrial buildings

- 4 Versatile stair configurations can be achieved with stair moulds
- 5 Access and exit landings can be integrated in the mould
- 6 Precast stairs are an indispensable part of modern residential construction
- 7 Precast stairs also have their uses in multi-storey car parks



## MULTIFUNCTIONAL STAIR MOULDS

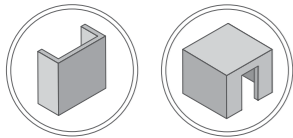
Precast concrete stairs are now an indispensable part of modern residential and industrial construction. Construction times are significantly reduced, a consistently high level of exposed concrete quality is guaranteed and the final assembly is simplified. Straight adjustable stair moulds provide the optimal solution for every requirement. Stairs, with or without landings, are produced either overhead or standing. The following continuously variable dimensions are possible: tread depth between 220 – 320 mm, riser between 150 – 220 mm and tread widths between 900 – 1,200 mm. The soffit thickness is variable.

For clockwise and anticlockwise stairs, the individual steps are simply adjusted by turning. The steps can be produced with a sharp or bevelled edge, while the step shape can be rectangular or produced with an undercut. Up to 17 steps can be produced in the standard form, and up to 24 steps with an extension. Staircases are the ideal solution for extra-wide stairs with access and exit landings.



- 4 Multifunctional stair mould
- 5 Access and exit landings can be integrated in the mould
- 6 Precast stairs are an indispensable part of modern residential construction
- 7 Precast stairs also have their uses in multi-storey car parks

## FORMWORK SYSTEMS FOR SPECIAL CONCRETE ELEMENTS

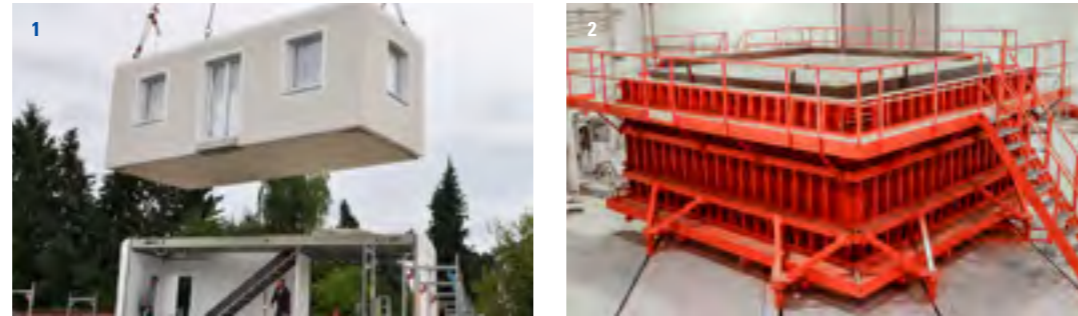


### FORMWORKS FOR ROOM MODULES AND SPECIAL CONCRETE ELEMENTS

As an experienced specialist, we offer technically multifunctional special moulds for light and lift shafts, infrastructural concrete elements such as bridge beams, sewer and tunnel shafts or special architectural elements.

We also offer a special portfolio for the production of room modules made of precast concrete elements; for example for sanitary modules or mobile office buildings, which are currently very popular and offer many advantages. As they are completely pre-assembled with interior fittings, installations, etc., they can be installed straight onto the construction site as a self-supporting structure.

- 1 Concrete room modules
- 2 Multivariable moulds for room modules
- 3 Special formwork systems ensure flexibility



## AUXILIARY EQUIPMENT FOR PRECAST CONCRETE PRODUCTION

### LOADING AND TRANSPORT SOLUTIONS FOR EFFICIENT LOGISTICS PROCESSES

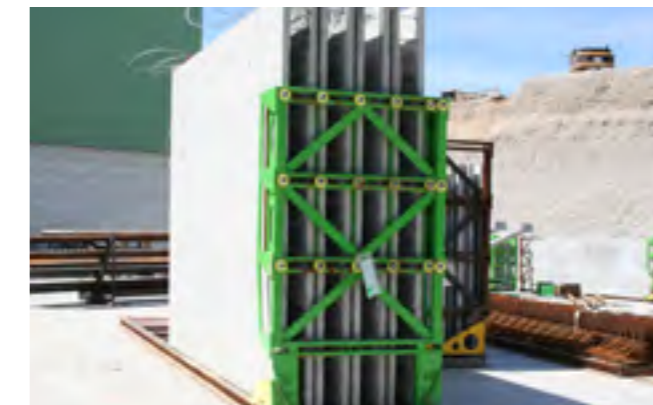
Efficient loading and transport solutions are indispensable today for safe and economical processes in the concrete plant.

#### Load beams

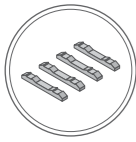
Load beams ensure the easy loading of concrete elements. Combined with a remotely operated release hook, the crane attachment points can be released from the ground by means of pneumatics, which considerably reduces the risk of accidents.

#### Transport vehicles, set-down racks and tilting jigs

We supply a wide variety of set-down racks and transport vehicles with sub-axle or swivel-pin steering for the shipping of precast elements as well as for internal handling around the production plant. We can develop purpose-built products, such as heavy duty models or hoists, to customer specifications. High quality, robust parts and components minimise wear and ensure that downtime and maintenance costs are kept low.



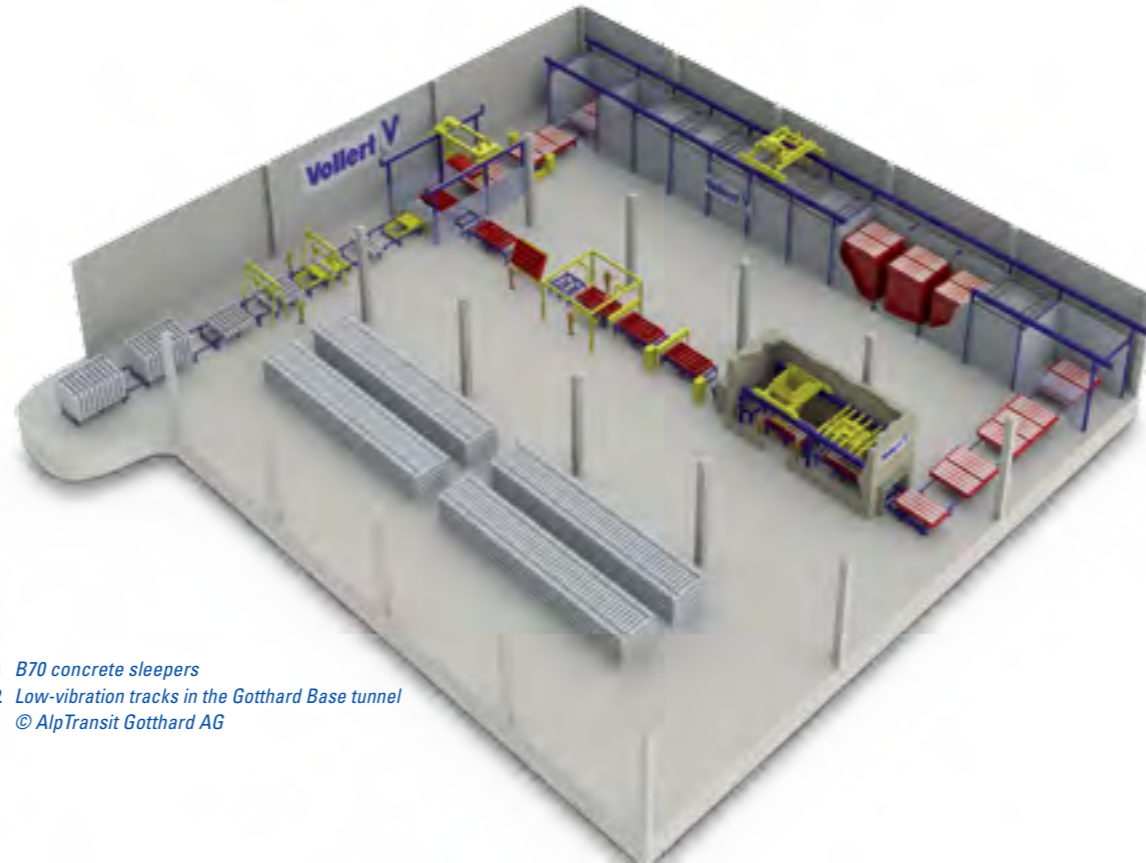
# SYSTEM CONCEPTS FOR CONCRETE SLEEPER PRODUCTION



## RAILWAYS AND RAILWAY NETWORKS WITH EXPERTS KNOW-HOW

Nowadays, railways and railway networks are equipped with concrete sleepers. Industrial pre-production and highly automated machine technology is needed to meet the high demand from private industry and the public sector.

Vollert's state-of-the-art mould circulation systems are now the worldwide standard for the manufacture of prestressed concrete sleepers and low-vibration tracks for the railway industry. Whatever the project – monobloc sleepers, bi-block sleepers, late demoulding processes or immediate demoulding processes, from low automation and upgradeable start-up processes through to the world's largest concrete sleeper plants in Mexico, Thailand or Turkey – our experts bring their know-how to bear.



1 B70 concrete sleepers  
2 Low-vibration tracks in the Gotthard Base tunnel  
© AlpTransit Gotthard AG



## INDUSTRIAL PREFABRICATION OF RAILWAY SLEEPERS

Baku's congested subway network will be expanded from 36.7 km to 119 kilometres by 2030, while in Thailand 1.73 million railway sleepers will be produced over the next few years for infrastructure development and for connecting rural areas to the boom cities – such mega-projects are only feasible through the industrial precasting of railway sleepers.

As experts, we have been automating concrete sleeper plants since the 1980s. For example, Vollert developed a circulation system for the production of the concrete sleepers for the 57-km long Gotthard Base Tunnel, based on the Low Vibration Track System, for the Swiss company Vigier Rail. In 2011, two production plants for a total of

1.1 million prestressed concrete sleepers were completed in just twelve months for Inkol Insaat in Turkey – 180 sleepers per hour. 450 quadruple moulds are constantly in circulation in highly automated plants. In Monterrey, Mexico, GIC has been using a Vollert system for the production of concrete sleepers for the Central American and US markets since 2014.

Here, we not only supply the plant production technology but also provide engineering services for the planning and implementation of track systems.

1 Concrete sleeper mould circulation system  
2 Sleeper forms in the curing chamber  
3 Concrete sleepers after the production process

REFERENCE PROJECT

**BAKU METRO, AZERBAIJAN**

Baku is booming. The infrastructure of the 2.2-million-metropolis is barely keeping pace with this dynamic growth. One of the biggest challenges: public transport with more than 200 million passengers a year. A key aspect is the subway network, which is to be expanded to 119 kilometres and 55 new subway stations by 2030. The Vollert engineers developed a completely new concept for the whole track system and designed and tested it on a test track. At the same time, a concrete sleeper plant was designed and installed to produce customized concrete blocks for the subway line.

OUTPUT



LEVEL OF AUTOMATION



INVESTMENT



For further information on this project and the construction system: [vollert.de](http://vollert.de)



1 Baku Metro production plant in Baku  
2 Concrete sleeper blocks  
3 Low-vibration tracks for Baku's new metro lines



REFERENCE PROJECT

**STRABAG, THAILAND**

The global construction company STRABAG is supplying 1.73 million railway sleepers for infrastructure projects to expand the Thai transport network. The B70 prestressed concrete sleepers are produced in a new state-of-the-art precast concrete plant near Bangkok. Up to 270 moulds are in constant operation in the circulation system, which ensures significantly higher plant productivity compared to stationary production. The railway sleepers are delivered completely ready for laying. The system is highly automated, from assembling the anchors, through the tensioning and detensioning stations to the concrete application.

OUTPUT



LEVEL OF AUTOMATION



INVESTMENT



For further information on this project and the construction system: [vollert.de](http://vollert.de)



1 The reinforcement wires are semi-automatically prestressed with a tensioning force of 460 kN  
2 Electrically driven discharge screws pour the concrete into the mould with high precision  
3 Turning crosshead for the demoulding process  
4 A lifting traverse in the exit area of the curing chamber



# COMMITTED TO PROVIDING PERSONALIZED SERVICE AND ONESTOP SOLUTIONS

## PLUS SERVICES

Is your system technology fit for the next 5, 10, 20 years? Our engineers know your machines and processes and know what weaknesses and faults can occur in their life cycle. Whether it concerns a concrete spreader, curing chamber or vacuum turning equipment, our Lifecycle Plan-

ning concept makes downtimes or dangerous everyday situations for man and machine a thing of the past. In addition, with our modernization packages, we can bring your machine technology back up to the latest state of technology, simultaneously increasing your plant productivity.

Our experts advise you in face-to-face discussions and develop a solution concept optimized for the task. Training, suitable spare parts and worldwide call readiness are a matter of course for us.



# ALWAYS THERE FOR YOU – YOUR PRECAST CONCRETE EXPERTS



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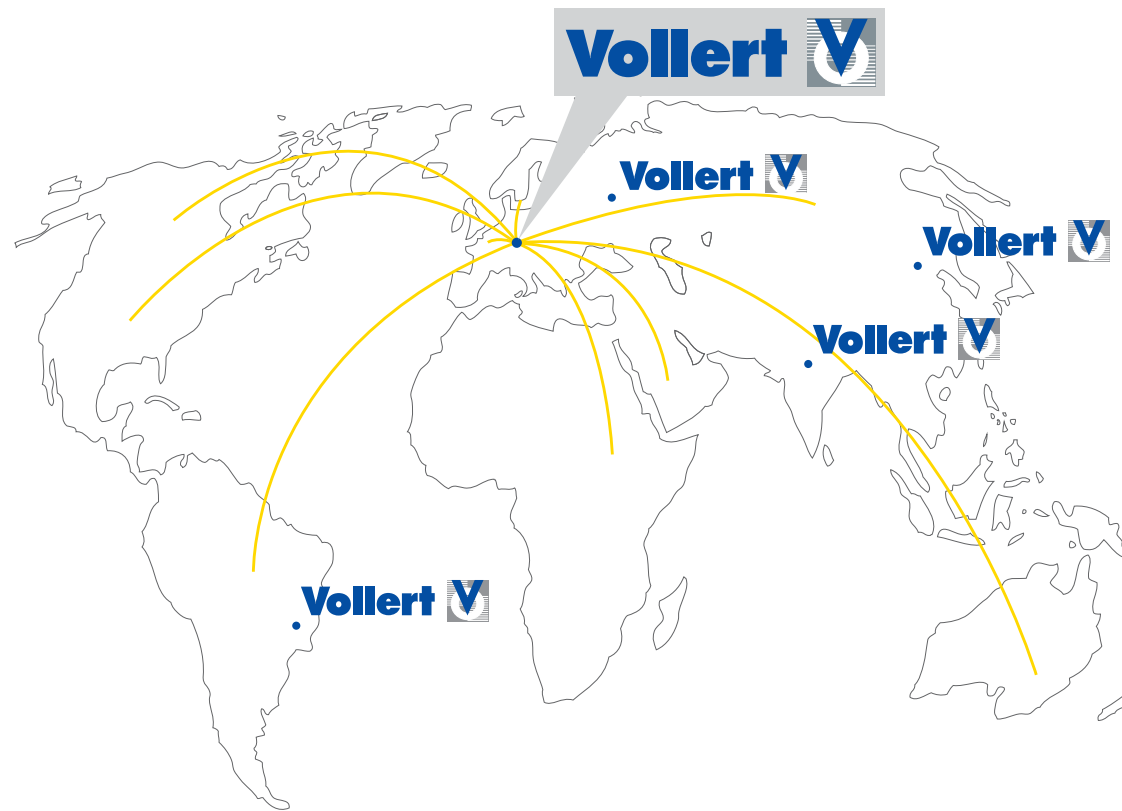
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