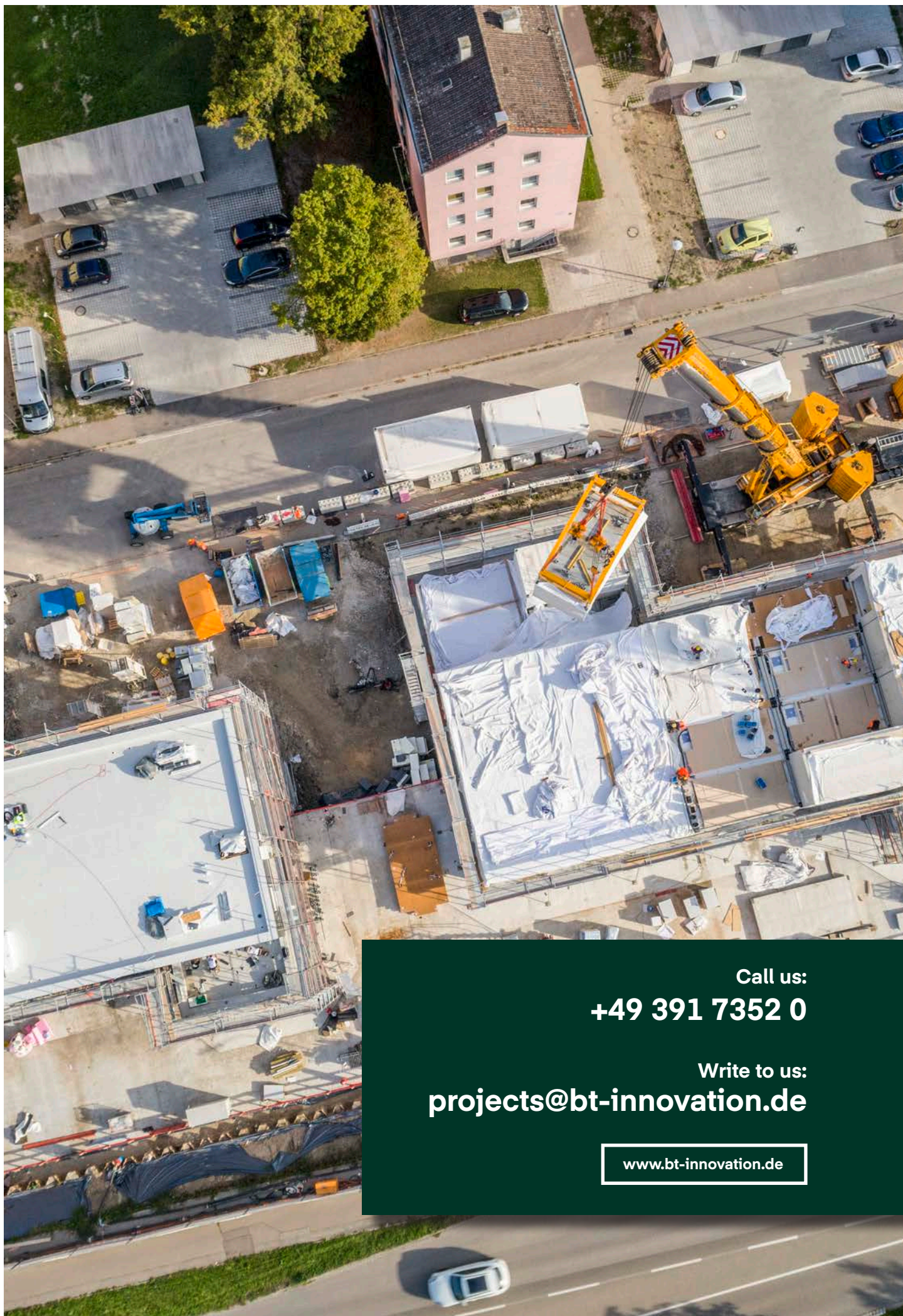


For faster construction



Research for
the future

Butterfly Battery® Mould Product Catalogue



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BT INNOVATION - FOR FASTER CONSTRUCTION

We Change the Way We Build with Concrete

B.T. INNOVATION GMBH

is a company in the construction supply industry which is successfully established on the national and international market since 1991. We are active with over 60 employees at our headquarters in Magdeburg. Our range of services ranges from development and sales of innovative products to technologies for the construction site and precast industry and consulting. Our international team is consisting of experienced sales specialists and engineers who develop and commercialize products and solutions for worldwide distribution. Increasing numbers in international protective rights, patents and product certifications as well as building regulatory approvals verify the successful development activity.

PRODUCTS & TECHNOLOGIES FOR THE CONSTRUCTION SITE

Our products for the construction site are characterized by groundbreaking approaches and an easy handling. They were specially designed for the use on construction sites for an easy installation with less workforce and without high assembly costs.

SEALANTS AND WATERPROOFING

Our sealing products are the ideal choice for sealing fresh or hardened concrete. Regardless of joint or surface sealing, we have the right product for every situation.

PRODUCTS & TECHNOLOGIES FOR THE PRECAST CONCRETE INDUSTRY

Our wide range of solutions from areas of magnet and formwork technology increases the performance and profitability of every production. The patented products from BT innovation constantly redefine the status quo in the industry.

BUTTERFLY BATTERY® MOULD

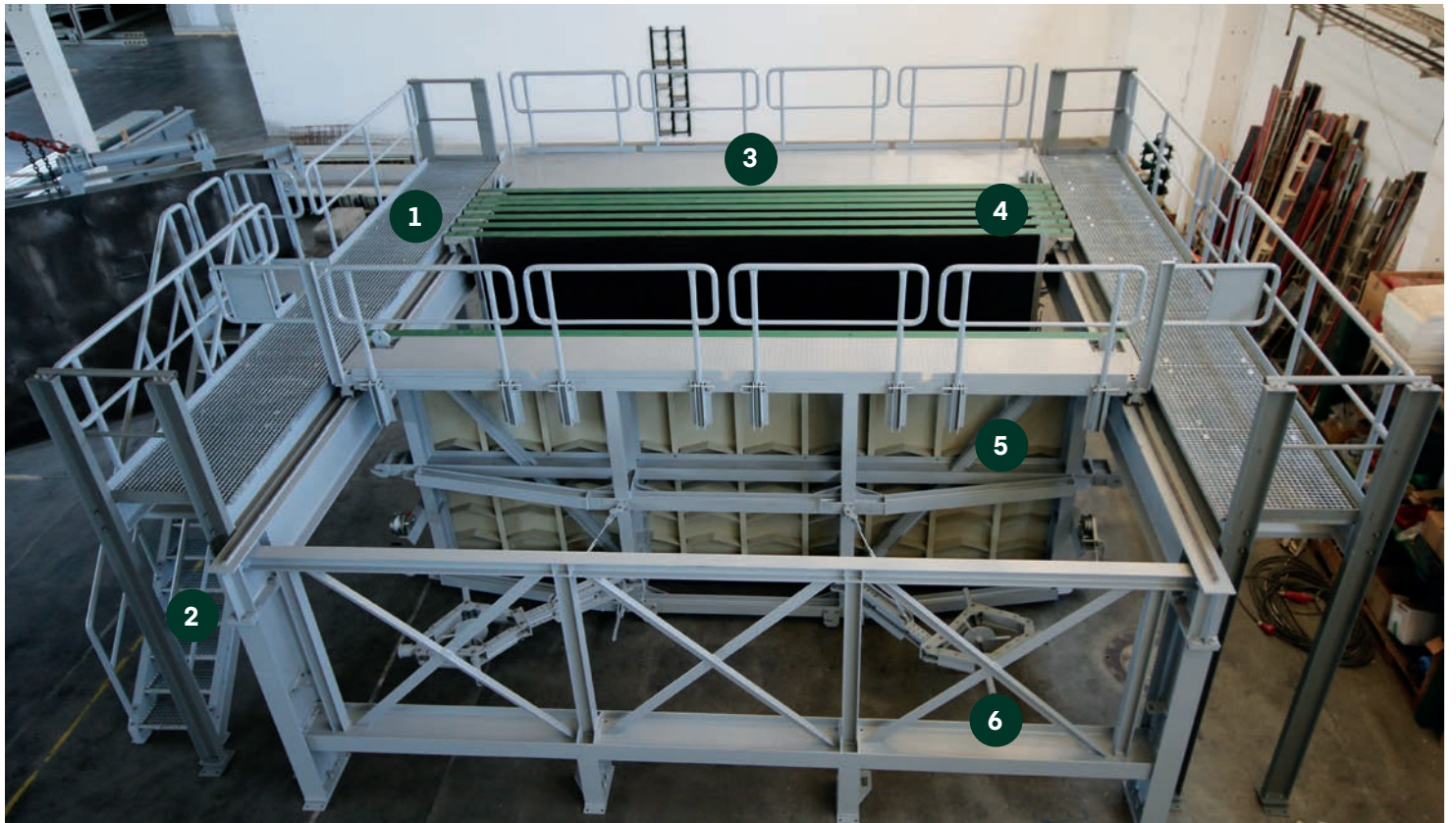
The patented Butterfly Battery® Mould enables the stationary production of precast concrete parts with up to 4 times the productivity. The Butterfly Battery® Mould combines the advantages of the horizontal preparation with those of vertical production.

LOW COST HOUSING

Our „Low Cost Housing“ concept offers an affordable high quality living space. A solid 36m² house made of concrete with a kitchen, bathroom and two bedrooms can be set up in 2 hours with the use of the BT-Spannschloss® (turnbuckle). This is only one example out of many more possibilities.

CONSULTING

Whether a new precast concrete plant is built, an existing plant is planned to be modernized or resources should be used more efficiently – we stand by our customers with our extensive know how and expertise as a consultant.



Components

- 01 Gangway
- 02 Stairs
- 03 Fixed tension wall
- 04 Bulkheads
- 05 Movable tension wall
- 06 Steel frame
- 07 Side shutter
- 08 Clamp
- 09 Bottom shutter

STATIONARY PRODUCTION OF PRECAST CONCRETE ELEMENTS WITH 5-SIDED FORMWORK SMOOTH SURFACE

Battery Mould

Battery moulds have been popular in the late 60s and early 70s. In recent years, the rheological possibilities of F5 and F6 concretes and self-compacting concrete (SCC) have significantly increased the use of battery moulds worldwide.

The battery mould is used for the vertical, simultaneous production of panel-shaped precast concrete elements with 5-sided formwork smooth surfaces. Battery moulds contain several casting compartments mounted in a frame.

The casting compartments consist of a formwork table and a bulkhead which is dividing the adjacent casting compartments. To absorb the hydrostatic pressure during concreting, the formwork compartments along with the bulkheads are braced between a fixed tension wall (end panel) and a movable tension wall.

In general, all kinds of battery moulds consist of a number of similar, parallel positioned bulkheads, between which the casting compartments for the final precast concrete element are located. The casting compartments are closed with a bottom shuttering and on both sides with side shutterings. The concreting is executed from above.

The battery mould enables the cost-efficient production of complex and extremely high-grade concrete elements with high visual requirements and minimum geometric tolerances.

The design configuration with a fixed tension wall on one side, in combination with several movable formworks and a movable end panel is called mono de-

sign. In the duplex design (double battery), the fixed central tension wall is located between the movable formwork elements and the two movable end panels.

Opening and closing (locking) the casting compartments take place mechanically or electrically. Each compartment is additionally tensioned with a robust and low-maintenance clamping system. Due to especial design of our battery moulds, the access to all opened casting compartments is easily provided.

BT innovation develops customised battery moulds including assembly and commissioning. The number and size of the casting compartments are individually adjusted. The formwork surfaces are manufactured in one piece without seams or hems. The steel panels are specially rolled for smooth steel formwork surfaces, fine-straightened, blasted and ground to the agreed roughness measures.

BT battery moulds are available as a standing/ bottom-driven version or as a hanging version with rails on top.

COMBINE THE ADVANTAGES OF HORIZONTAL PREPARATION AND VERTICAL PRODUCTION

Butterfly Formwork®

For accelerated production processes, BT innovation has patented the butterfly formwork a casting compartment that can be removed from the battery mould. After only about 4 hours (at a strength of 3-8 N/mm²), the precast elements can be removed from the battery together with the formwork and stored outside the battery for hardening. The battery is immediately ready for the next production cycle.

Butterfly formworks are special bulkheads for battery moulds. They consist of two formwork panels which are connected to each other by a robust hinge.

To prepare the precast concrete elements, the butterfly formwork is removed from the battery mould and opened. In this way, preparation steps for the precast elements are carried out horizontally more conveniently, with higher speed and accuracy.

They can then be transported horizontally to various workstations like circulating pallets. After completion of all preparation activities, the butterfly formworks are folded up again and transported into the battery mould.

The butterfly formwork is suitable for a combination of horizontal and vertical concreting, e. g. for facade panels. The ashlar or brick-faced facade can be concreted horizontally; the load-bearing layer is then produced vertically in the battery mould for a formwork-smooth inner wall surface.

The butterfly formwork can also be used without the battery as a replacement for a tilting table.

Operation



01

Fully prepared butterfly



02

Lifting the butterfly

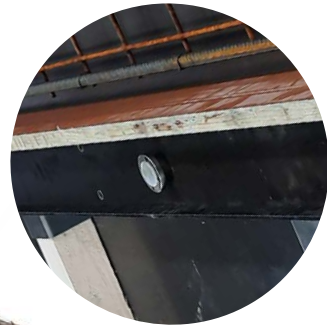


03

Folding up the butterfly

The system solutions by BT innovation make the butterfly formwork unique:

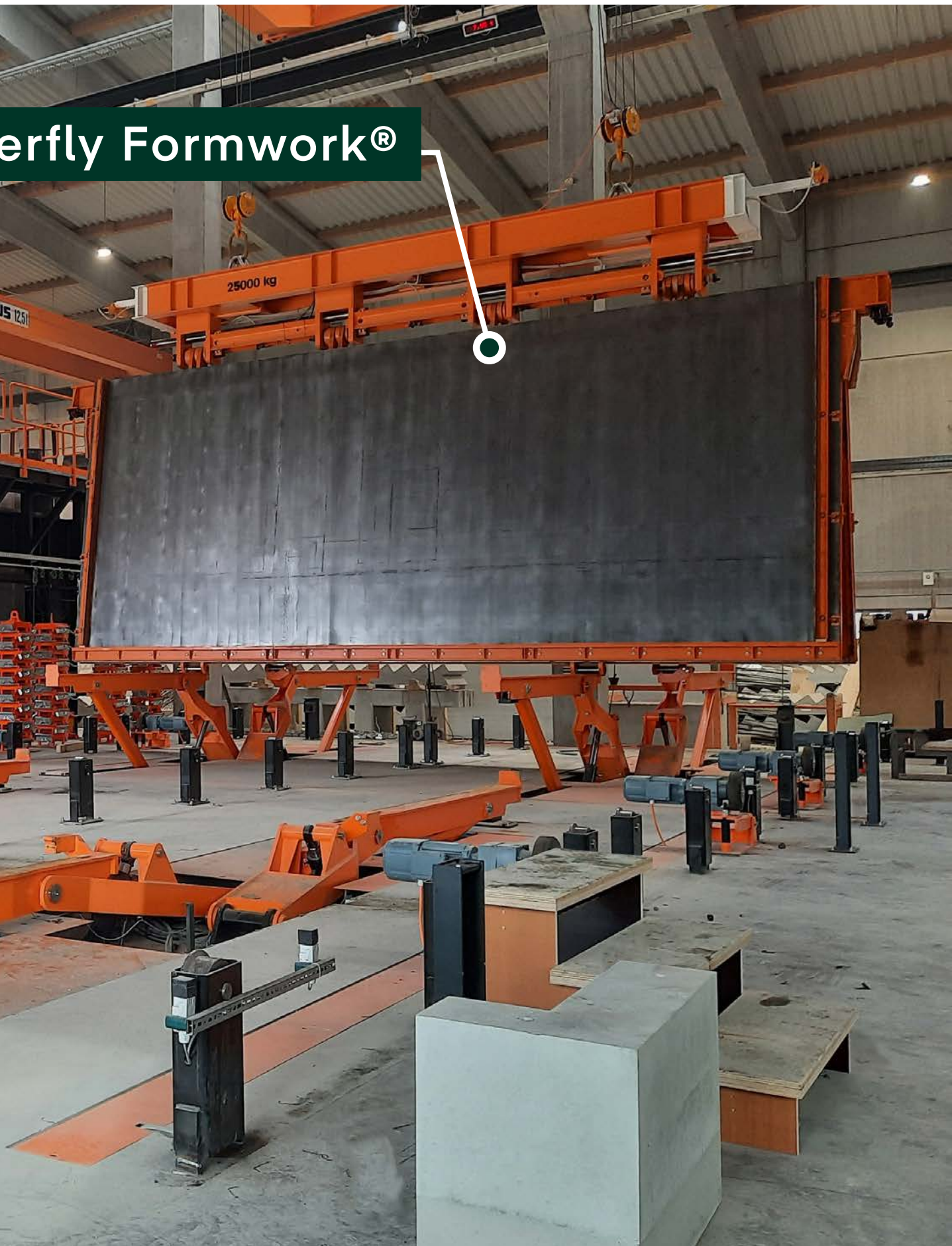
The MagFly® AP magnet with the proven MagFly® technology in combination with the MultiForm shuttering enables the positioning and alignment of shutterings, window and door openings within minutes. With an adhesive force of 22,000 N and a weight of only 5.40 kg, it has the best adhesive force-to-weight ratio in its class worldwide. Recesses for built-in parts or electrical installations are precisely created with the BT magnetic recess formers.

**H-PROFILE WITH
INTEGRATED MAGNETS****MAGFLY® AP****MULTIFORM**



Butt

Batterieschalung



INNOVATIVE SYSTEM SOLUTION FOR CONCRETING UP TO 4 TIMES PER DAY

Butterfly Battery® Mould

Horizontal preparation and vertical production – the Butterfly Battery® Mould combines the specific advantages of horizontal preparation with the vertical concreting of panel-shaped precast concrete elements. The symbiosis of the patented butterfly formwork with the proven battery mould significantly accelerates the production process.

With the Butterfly Battery® Mould, all preparatory work can be carried out comfortably and effectively in horizontal position: from measuring with a laser (or marking with a plotter), through formwork construction and positioning of the built-in parts to the insertion of the reinforcement.

Parallel work sequences on horizontal formwork tables outside the battery significantly reduce the set-up time, and the battery mould can be completely re-equipped within a very short time.

The precast elements can be demoulded together with the butterfly formwork just a few hours after concreting and stored outside the battery for hardening. Since the precast elements do not have to carry their own weight during lifting, the necessary waiting period is reduced. Already at a strength of 3-8 N/mm² the prefabricated parts can be removed from the battery together with the butterflies. Concreting up to 4 times per day becomes possible.

The butterflies can be moved between the individual workplaces with the aid of roller conveyors/friction wheel drive like the pallets of a circulation system. With the integration of the patented hinged formwork, the battery mould becomes circulation system-capable. This enables a high degree of automation and a

highly efficient overall process for the battery mould. This also results in new approaches to cost optimisation for sandwich walls or prefabricated brick-faced elements with a formwork smooth internal surface. The integration of a battery mould into a circulation concept combines the process advantages of the circulation technology with 5-sided visual request and the high quality requirements and capacities of a battery mould.

The Butterfly Battery® Mould is used by leading precast manufacturers; several plants are located in Germany, Austria and South America.

The capacity of the Butterfly Battery® Mould is rather freely scalable. The butterfly technology enables concreting up to 4 times per day, is extremely space-saving and produces precast elements 5-sided formwork smooth. If the butterfly technology is used, a production hall of only 10,000 m² is required to produce the precast elements for 500 apartments of 70 m² each month. The investment costs are lower than for all comparable production facilities.





Advantages

- ✓ Horizontal preparation, vertical concreting
- ✓ 5-sided formwork-smooth (fair-faced) surfaces
- ✓ Measuring with laser projection possible
- ✓ Jointless formwork surfaces
- ✓ Concreting up to 4 times per day
- ✓ Low floor space requirement
- ✓ Lower investment costs than tilting table solutions
- ✓ Reduction of production costs¹ by up to 40%
- ✓ Efficient heating system
- ✓ Also available as circulation system
- ✓ Successfully used by market leaders

Application

- ✓ Production of solid walls
- ✓ Production of sandwich walls
- ✓ Production of facade elements
- ✓ Production of brick-faced elements
- ✓ Production of balcony slabs
- ✓ Production of (coffered) ribbed ceilings
- ✓ Usable also as tilting table

* BT innovation distributes the Butterfly Formwork® and Butterfly Battery® for stationary applications on the basis of an exclusive license from NEULANDT GmbH.

High Performance Battery Mould in comparison to Butterfly Battery® Mould

	High performance battery mould	Butterfly Battery® Mould
5-sided formwork smooth precast elements (fair-faced)	✓	✓
Compatible with magnet technology	✓	✓
Lower investment requirements than with conventional production methods	✓	✓
Lower area requirements than with conventional production methods	✓	✓
Lower heating requirements than with conventional production methods	✓	✓
Prefabrication of solid walls	✓	✓
Prefabrication of balcony slabs	✓	✓
Prefabrication of ceiling slabs	✓	✓
Prefabrication of 1-layered facade elements	✓	✓
Prefabrication of 2-layered insulated elements	✓	✓
Prefabrication of 3-layered insulated sandwich walls (core insulated)		✓
Prefabrication of brick-faced precast elements (prefabricated elements with brick-faced facade)		✓
Prefabrication of brick-faced insulated precast elements (brick-faced facade + core insulation)		✓
Measuring with laser projection possible		✓
Marking of positions with plotter		✓
Horizontal formwork setting		✓
Horizontal positioning of pattern matrices		✓
Horizontal reinforcement mounting		✓
Parallel working outside of battery mould		✓
Concreting up to 4 times per day		✓
Shorter emptying cycles of battery mould		✓
Usable also as tilting table		✓
Adaptable into circulation systems		✓
Can be delivered as circulation system		✓

WHAT YOU ALWAYS WANTED TO KNOW...

FAQ

How often is concreting possible per day?

According to the current state of the art, the Butterfly Battery® Mould has a capacity of concreting up to 4 times per day in a three-shift operation. Even with unskilled personnel, 3.6 casting rounds per day have already been realised. In cold seasons, energy-efficient heating systems support the continuous utilisation of the capacity.

How is a high capacity achieved?

The precast elements can be demoulded together with the butterfly formwork just a few hours after concreting and stored outside the battery for hardening. Since the precast elements do not have to carry their own weight during lifting, the necessary waiting period is reduced. Already at a strength of 3-8 N/mm² the prefabricated parts can be removed from the battery together with the butterflies. In this way, concrete can be poured every 5-6 hours.

Is a special magnet system required for vertical use?

In general, there is no special magnet system required for the battery mould, but BT innovation offers a highly efficient solution: The MagFly® AP system magnet, with the proven MagFly® technology for easy positioning and alignment of formwork and magnets, enables the positioning of shuttering or window and door openings within minutes.

Is the butterfly technology compatible with circulation systems?

The Butterfly Battery® Mould can be designed as a circulation system. Our consultants will thoroughly support you with the implementation process of such a project.

**For further questions
our competent team
is at your disposal
at any time.**

Call us:
0391.73 52 0

Write to us:
projects@bt-innovation.de

SERIAL MODULE CONSTRUCTION WITH THE „MAXMODUL“ SYSTEM - BUTTERFLY BATTERY® MOULD

Reference Max Bögl

The Bavarian construction group Max Bögl stands for innovative serial building concepts. With over 6,000 employees and an annual turnover of more than 1.65 billion euros, Max Bögl is one of the largest German companies in the construction industry. The range of services and the depth of added value include our own concrete plants. In 2017/2018, the company invested in a precast plant for the serial production of modules for multi-storey residential construction. At the Mühlhausen site, the "maxmodul" system is now produced in serial modular construction.

The room modules for buildings up to the high-rise limit are assembled in the factory from prefabricated concrete elements. With the goal of achieving a maximum degree of prefabrication, the extension is carried out directly afterwards. The industrial environment enables controlled serial production with the highest precision. The modular construction makes production and assembly independent of the weather. Residual work on the construction site is minimised and construction times are significantly shortened. For the production of the maxmodul precast concrete elements, the Max Bögl Group relies on the technology of BT innovation, the Butterfly Formwork® and the Butterfly Battery® Mould.

Butterfly Formwork® is a removable and hinged bulkhead for battery formwork. With the use of butterfly technology, Max Bögl Modul AG combines the advantages of a classic battery formwork – namely formwork-smooth walls on both sides, compact working area for fresh concrete processing, high energy efficiency when heating the moulds and much more. – with the advantages of a horizontal pallet circulation system.

For the first time in the world, Max Bögl is using circulation technology in conjunction with battery formwork. For formwork tasks, the measuring of built-in parts, as well as the insertion and fixing of reinforcement, the Butterfly Formwork® is conveyed with friction wheel drives on fixed rollers to various cycle stations that are optimally equipped for the respective activities. The work is supported by laser projection equipment.

The stations for opening and closing the Butterfly Formwork®, as well as the magazines for the intermediate storage of prepared Butterfly Formwork® or Butterfly Formwork® with hardened precast concrete elements, work fully automatically. The control is taken over by a production master computer, which on the one hand supplies the individual machines with the necessary data and on the other communicates with the higher-level ERP system.

Concreting is also automated. The concreting process is also automated. The position of doors or windows is of course taken into account.

The entire plant was designed by the BT innovation consulting team, which also coordinated the development of additional project-specific special machines. The realisation was then carried out together with a renowned machine and plant manufacturer and a leading supplier of control technology.



Expansion line for maxmodul room modules



Modular house





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