

Modularized off-site prefabrication for industrialization of construction

The worldwide trend of prefabrication in construction industry is gaining momentum increasingly, and the reasons for this approach are being recognized more and more. Industrialized or modularized construction provides time and cost savings and an ensured quality, due to efficient production in an off-site and controlled environment. This fact is even more critical in mass housing projects which are nowadays much needed for most of the countries in the world to address their excessive need for affordable housing.

The modularization of building components can be carried out in different levels; from individual studs and blocks, over wall and slab panels, up to finished room cells. For prefabrication of large panels, there are different methods, and accordingly various equipment with pros and cons in each case. With successful experience in design and manufacturing of both horizontal and vertical precast equipment, B.T. innovation GmbH has introduced the Butterfly Battery Mould®, as a solution to combine the advantages of horizontal preparation and vertical casting of precast elements. The Butterfly Formwork® as a double shuttering platform provides an easy and

accurate preparation of inbuilt parts (anchors, door and window openings, utilities, etc.) and reinforcement on a working station.

Working stations can be designed like carousel systems; Also known as circulating pallets, they are among efficient prefabrication setups, where each station is assigned to a specific task as cleaning, placing the shuttering, placing inbuilt parts, reinforcement etc. the same procedure can take place for preparation of butterfly formworks, while moving from station to the next. The number, size and arrangement of working stations are all defined based on actual production constraints like capacity, available space, tact times or budget. The outcomes of preparation circle are butterfly formworks, which then fly into the battery mould and function as integral parts to enable the simultaneous production of several panels vertically.

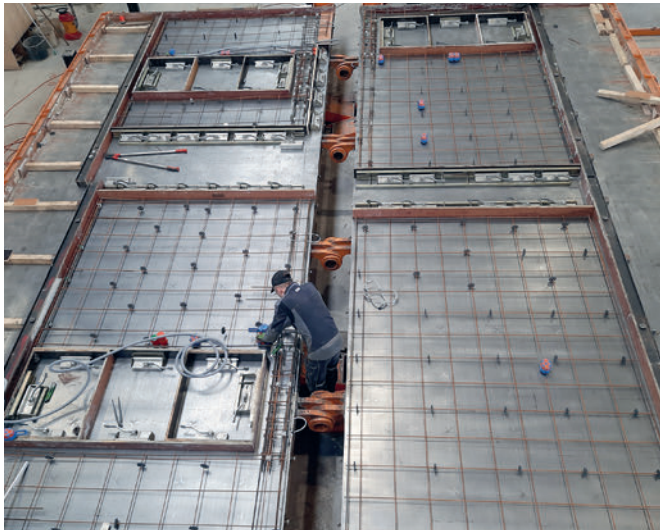
To form the elements on the butterfly surface, BT innovation provides reinforced and tailored shuttering solutions. The well-known and trusted MultiForm profiles and MagFly® magnets of BT innovation are shaped and positioned opti-



Modular off-site production in the precast plant enables short construction times due to high degree of prefabrication



Patented Butterfly Battery Mould combines the advantages of horizontal preparation and vertical production



Butterfly formwork in unfolded position - horizontal preparation



Insertion of a Butterfly Formwork into the Butterfly Battery Mould



Smooth folding up the formwork with special hydraulic equipment

For faster
construction



B.T. INNOVATION GMBH

BUTTERFLY FORMWORK®

COMBINE THE ADVANTAGES OF
HORIZONTAL PREPARATION AND
VERTICAL PRODUCTION.

- ✓ CONCRETING UP TO 3 TIMES PER DAY
- ✓ REDUCTION OF PRODUCTION COSTS BY UP TO 40%
- ✓ PRODUCTION OF DIFFERENT CONCRETE ELEMENTS
- ✓ 5 SIDE FAIR-FACED CONCRETE ELEMENTS

Step 1: Horizontal preparation

Step 2: Folding up the formwork

Step 3: Vertical concreting in the battery

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Shuttering formwork MultiForm with MagFly magnets

mally to bear the significant hydraulic pressure of fresh concrete at a height of up to 4 m.

Horizontal preparation on the butterflies makes it possible to use laser projectors to mark up the positions of in-built items, openings, and shuttering profiles. Furthermore, control systems using customized handling software contribute to a well-planned and safe working process in the precast plant.

These features are typically not possible by classic battery moulds where all the steps need to be carried out vertically in relative tight working spaces between the compartments. Moreover, transferring the preparation steps from Battery Mould to Butterfly formworks outside of casting compartments, provides the flexibility to plan necessary equipment and increase the daily production to more than one casting a day.



Butterfly Battery Mould with MagFly magnets

The most tangible advantages of prefabrication are, of course, evident in the assembly phase on the construction site. Precisely manufactured components are assembled much faster than conventional construction methods. The savings from fewer labor hours, machine use and potential traffic closures are enormous. Moreover, Off-site production makes it possible to carry out residential construction projects in difficult weather conditions, where in-situ concreting would be impossible or very time-consuming and costly. Qualified welders or concrete workers are no longer needed as often on the construction site and can be replaced by unspecialized fitters who erect the elements and fasten the connections.

Butterfly Battery Mould system is now being used in Europe and Africa, in different levels of automation and complexity. End products are high quality panels with extremely smooth surfaces on all sides which are either directly installed in



Control point for unfolding and folding station, transport of the butterflies and laser projectors



Even under difficult weather conditions and with local unspecialized workers, rapid assembly of precast elements on the construction site is possible.



All sides formwork-smooth elements as components of room modules



Direct use of prefabricated elements on the construction site

buildings on site, or are structural components of precast room modules in factory. B.T. innovation GmbH as a technology provider in precast industry focuses on the individual requirements of the clients and develops tailored and customized solutions with regard to targeted budget, capacity, size, or scope of delivery. ■



Video about the Butterfly Battery Mould for precast elements in modular construction



FURTHER INFORMATION



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