

# Ineton Kft. – Precast Concrete Plant for the Future of Construction in Hungary

■ Dipl. - Ing. (FH) Markus Obinger, Prilhofer Consulting GmbH & Co. KG, Germany

Ineton Kft., based in Budapest, Hungary, has built and taken into operation a new highly automated precast plant in the south of Budapest in Alsónémedi. Ineton Kft., which emerged from Repet Environmental and Építő Kft. in the early years of the 2000s as an expert company and general contractor in the field of environmental engineering with significant hydraulic engineering, wastewater treatment, remediation and landfill projects, has subsequently developed into a general contractor for complex construction projects in many different areas. The decision in 2020 to invest in a modern precast concrete production facility was a logical step to take the company's continuous development to a new level. Building with precast concrete elements leads to a significant reduction in construction times for both the shell and the finishing times of the shell due to pre-installed services for the entire HVAC system.

In summer 2020, Prilhofer Consulting was assigned with a study for the development of a plant concept. In a first step, the targets and requirements were developed in several workshops and thus the parameters for the development of the new factory were defined. It became clear very soon that Ineton would like to position itself across many sectors and that the new precast plant would be aimed at residential and commercial construction projects as well as industrial construction.

The focus for Ineton is to create high-quality buildings, with superior aesthetic and technical standards. The estimated market volume supported the ambitious development goals of becoming the most efficient construction company in Hungary in the targeted area. Environmental awareness, sustainability and resource-saving use of materials were crucial to the planning right from the beginning. Shorter project cycle times also lead to a significant reduction in financing and project risks in general.

In Hungary, there is also a noticeable increase in the shortage of qualified skilled workers in the construction industry. In this context, prefabricated construction offers the opportunity to become less dependent on the availability of skilled workers within certain limits.



*New production hall in Alsónémedi*

As an innovative company, Ineton has also made it a precondition that the processes from the first project design to the planning of the elements and HVAC engineering in the BIM model to the completion of the buildings are fully integrated.

With the results from the basic investigations, Prilhofer Consulting started to develop a plant concept and to carry out a site analysis of the selected property in Alsónémedi. The process and material flow planning must always go closely together with a comprehensive master planning for the selected location in order to be able to optimally design the entire plant infrastructure, traffic routes and storage areas.

Based on the requirements, Prilhofer Consulting developed a plant layout that is divided into several areas in a five-bay production hall and includes two pallet circulation systems.

In the first production bay, there are two 100 m long prestressing lines for trusses, beams and girders. There is also an automatic bending machine and preparation area.



*Prestressed concrete hall*

Neighbouring to this, in the next production bay, there are three twin formworks for columns, two of which are designed for columns with moulded-on foundations. In the same bay, a highly automated pallet carousel system for precast floor slabs and the cage production for the structural components were planned.

The third bay is intended for the reinforcement plants with fully automatic mesh welding plant with crimping and bending equipment for the production of precast floor slabs and solid walls. The mesh welding plant can directly discharge flat reinforcement meshes into the adjacent tilting table production area for balcony elements and the most complex sandwich elements, as well as for the stair formwork located here. The in-house fully automated just-in-time production of the lattice girders is directly connected to the pallet circulation system for the precast floor slabs by using an insertion robot.

An automated mesh crane serves the precast floor slab plant via a buffer line for mesh and also provides for the stacking and output of reinforcement mesh for external purposes.



*Mesh welding plant*



*Shuttering and demoulding robots precast floor slab plant*

The same type of connection of the mesh welding system is realised by a second mesh crane in the adjacent pallet carousel system for wall elements in bays 4 and 5. Lattice girders are delivered to the wall carousel system by means of a two-strand automatic transport trolley system located under the mesh welding system, where they are manually placed on the carousel pallets.

The pallet carousel system for wall elements is designed as a highly flexible system with production islands in order to be able to produce the targeted product range of double walls with and without insulation, solid and sandwich walls without negatively influencing different cycle and manual handling times for the individual products.

The concreting of the wall elements, operated by the formwork robot with highly flexible formwork system, is carried out by an automated concrete spreader. The formwork system enables up to 13 different wall thicknesses in the range of 80 mm to 470 mm to be automatically formed for solid and sandwich walls from 2 bases and 3 extension heights.



*Carousel system with production islands*



Concrete spreader and bucket conveyor system

A fully automated conversion station configures the formwork to a new formwork height if required. Together with the demoulding robot, a continuous automation of the formwork operations is achieved.

The concrete spreader is equipped with an interchangeable bucket system so that alternate concreting of coloured facing shells and grey load-bearing shells is possible without constant cleaning and washing cycles.

The concrete supply is realised by a mixing plant with two mixers and connected bucket conveyor system, which can supply the individual production areas of the factory with grey and coloured concrete using intelligent logic and priority control.

The finishing of solid and sandwich walls using helicopter smoothing machine takes place after an adjustable pre-curing time in the curing chamber on an intermediate platform above the concreting and double wall area. The platform is filled automatically using the centrally located rack operator.

In the precast floor slab plant, the elements are transported to the storage area with fully automated delivery trolleys and in the stationary production with simple rail-guided transport trolleys. In the pallet circulating plant for the wall elements, full use is made of the internal loader system. In the demoulding area, up to 6 internal loader pallets can be flexibly loaded and collected.

This plant concept was presented to Ineton together with a detailed investment cost estimate for production building, infrastructure, media supply and plant technology.

The profitability calculation provided by Prilhofer Consulting was intensively reviewed by Ineton and evaluated several times with different development scenarios of market volume, product prices and cost structures. The results of the profitability calculation were the final deciding factor in getting the green light for the investment, securing the financing and starting the next project phase.



Mixing plant

This began with the completion of the specifications for the plant technology and the request for quotations in spring 2021 and, after an intensive phase of comparisons of quotations, discussions and contract negotiations, culminated in the award of contracts in early autumn 2021.

After an initial intensive planning phase with a focus on the production building structure and foundations, construction work started at the beginning of 2022. In parallel, further engineering and manufacturing of the production machinery continued.

Disrupted supply chains due to the Corona pandemic and the massive price increases for construction materials and steel caused by the Ukraine war, as well as for machine and control components, posed enormous challenges for both Ineton in construction and the suppliers of plant technology. In a team effort, all challenges were mastered and the plant was successively completed in its designed concept and handed over to Ineton for operation.

The mixing plant of Simem S.p.A. was already put into operation in autumn 2022 and was able to provide the first concrete for the beginning production on the stationary formwork of Construx. At the same time, the installation of the two pallet carousel systems from Ebawe and the reinforcement systems from Progress began.

With the CAD planning of the first construction projects running in parallel, Ineton was able to create the basis for providing production data for checking data integrity and interface conformity to the automatic plants and to the Progress Software Development master computer system. In addition, the progress in the introduction of the ERP system ERPbos was discussed in regular coordination meetings and the tasks for the individual project participants at Ineton and Progress Software Development were worked out and coordinated.

With the completion and start-up of all plant units, Ineton is now in an excellent position to implement the goals set for the Hungarian construction sector. ■

FURTHER INFORMATION



INETON KFT.  
Weiss Manfréd út 5-7., B9 épület, 1. Emelet, 1211 Budapest, Hungary  
T +36 1319 7563  
[info@ineton.com](mailto:info@ineton.com), [www.ineton.com](http://www.ineton.com)



Prilhofer Consulting Gmbh & Co. KG  
[mail@prilhofer.com](mailto:mail@prilhofer.com), [www.prilhofer.com](http://www.prilhofer.com)



ALLPLAN Software Engineering GmbH  
[info.precast@allplan.com](mailto:info.precast@allplan.com), [www.allplan.com/precast](http://www.allplan.com/precast)



Construx b.v.  
[info@construx.eu](mailto:info@construx.eu), [www.construx.eu](http://www.construx.eu)



EBAWE Anlagentechnik GmbH  
[info@ebawe.de](mailto:info@ebawe.de), [www.ebawe.de](http://www.ebawe.de)

Progress Maschinen & Automation AG  
[info@progress-m.com](mailto:info@progress-m.com), [www.progress-m.com](http://www.progress-m.com)

Progress Software Development GmbH  
[info@progress-psd.com](mailto:info@progress-psd.com), [www.progress-psd.com](http://www.progress-psd.com)



Maschinenfabrik GmbH & Co. KG

Paul Maschinenfabrik GmbH & Co. KG  
[stressing@paul.eu](mailto:stressing@paul.eu), [www.stressing.paul.eu](http://www.stressing.paul.eu)



SIMEM S.p.A.  
[info@simem.com](mailto:info@simem.com), [www.simem.com](http://www.simem.com)