

innbau-beton GmbH & Co. Fertigteilwerke, 84562 Mettenheim-Hart, Germany

Products of maximum quality and precision through exact planning and optimised prefabrication

The innbau company has been active in the concrete industry in the southeastern region of Bavaria in Germany since the beginning of the 1970s. Although exclusively ready-mix concrete was produced at first, the decision was very quickly taken to produce and market precast slabs with in-situ topping as well. The precast slab with in-situ topping, which has a market share of well over 70% in Germany, is still one of innbau's most important products today. Further acquisitions as well as the building of a special new plant for precast slabs with in-situ topping in 1996 at the Mettenheim site have made innbau one of the largest manufacturers in South Germany with production of around 450,000 m² of precast slabs with in-situ topping.

In 1998 innbau seized the opportunity to take over an insolvent company. With only a little conversion and modernisation work, this allowed the production of double walls as well from that point on. However, with around 50,000 m² of double wall elements in recent years, the production capacity of the plant was continuously at full stretch, and so the decision was taken in 2010 to begin with the planning of a new plant that would reflect the state of the art and enable innbau in future to produce precast concrete elements with maximum productivity and quality and with sufficient reserves of production capacity.

Prilhofer Consulting was commissioned to plan the new double wall plant at the Mettenheim site – and for a good reason, too: when the plant for the production of precast slabs with in-situ topping was completely re-planned in 1996, it was also Prilhofer Consulting who, during the planning, foresightedly positioned and dimensioned the mixing plant – supplied by Doubrava and Wiggert – in such a way that the new double wall plant can today

be supplied with concrete from the same mixing plant without this leading to production bottlenecks for either of the works.

The plant was planned to meet the high customer demands and extremely short delivery times and particular importance was attached to work efficiency, product quality and the ability to react quickly. innbau does not manufacture mass-produced goods, but attaches importance to supplying high-quality precast concrete elements to satisfied customers.

Economical and time-optimised solutions for individual construction

With the commissioning of the new double wall plant in April 2013, innbau relocated its complete production capacity to the Mettenheim site. This entails logistic advantages – ultimately for the customers as well. Apart from the complete production, the Mettenheim site also accommodates the administration and the technical office. In the technical office the projects have been prepared especially for the precast element production using Nemetschek Allplan since as far back as 1998. Double walls and solid walls are planned on 5 workstations at present; due to the hybrid mode of operation of the software, the planners can choose between the 3D model and classic two-dimensional planning work at any time.

The results of the planning in Allplan Precast can be transferred directly via the appropriate module to the master computer in the works for the determination of the production data and are also available as element diagrams as well as overview and installation diagrams, formwork and reinfor-

cement diagrams, etc. Order data such as project name and number, client, building project, various addresses, etc. can be sent automatically to the commercial departments. In addition the quantities, weights and number of items determined in the CAD for precast elements, built-in components, reinforcements and all other invoiceable items can be used for further commercial processing without having to enter the data again.

For the new plant Prilhofer Consulting distributed the machines and plants for the double wall production over several levels in the new hall, which is located exactly between the floor production hall and the hall for the production of special parts.

Albin Schuster, acting partner, describes the goals that were pursued in the planning as follows: "Of course we can see the advantages of automation; but only when and where it also makes sense for us. With the core elements for the new plant, for example the formwork robot, we paid attention from the outset to maximum productivity and automation. In other areas, however, in which we can still get along with less automation in view of the present extent of utilisation and product range, we invested also only so much that we can immediately, simply and quickly extend our capacities if we need to or add new products."

In principle the double wall production at innbau passes through the well-known steps: Cleaning, shuttering, placement of the built-in components, installation of the reinforcements, concreting, hardening, demoulding and placing into storage. These work sequences of the pallet circula-

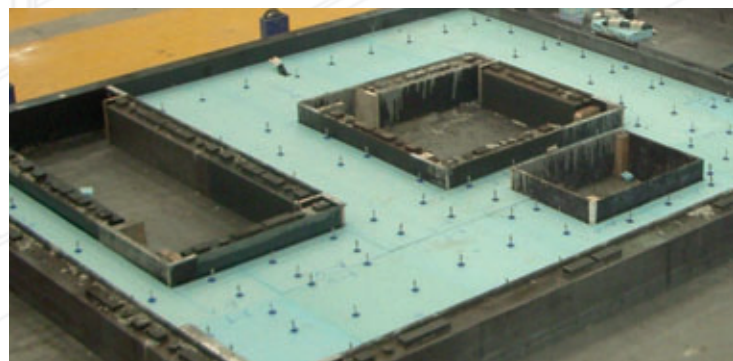


The double wall becomes a work of art in the truest meaning of the words at innbau



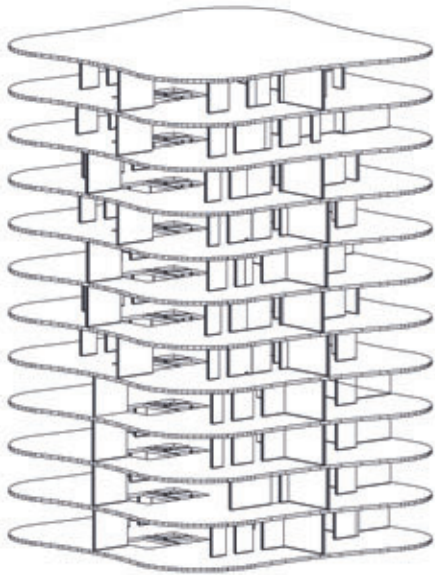
Production Engineering and Automation Systems for the Prefabricated Concrete Element Industry

- | Stationary line production
- | Tilting station
- | Pallet circulation plants
- | Transport and handling systems
- | Multi-Function-Shuttering-Robot (MFSR)
- | Concrete distribution systems for all purposes
- | Compacting systems
- | Finishing equipment
- | Shuttering systems
- | Shutterings for special purpose elements
- | Moulds for garages/moulds for rooms/special purpose elements
- | Shutterings for skeleton building systems
- | Moulds for columns/moulds for girders/moulds for TT-elements



SOMMER Anlagentechnik GmbH | Benzstraße 1 | D-84051 Altheim/Germany
Phone: +49 (0) 87 03 / 98 91-0 | Fax: +49 (0) 87 03 / 98 91-25
info@sommer-landshut.de | www.sommer-landshut.de





The projects, which are optimised for the precast construction method, are planned by innbau in advance in the minutest detail. This carefulness pays off – and the results are impressive. Shown here is the visualisation of a multi-story building in Munich, which was erected entirely using precast elements from innbau

tion plant, which was supplied by Sommer Anlagentechnik, are organised by an IPS-Leit2000 master computer from SAA engineering, which directly accesses the data of the Nemetschek software. The master computer directs the pallets at the right time to the right station, always according to the production requirements for the respective structural element. Currently a total of 45 pallets measuring 10.5 x 3.6 m are in circulation at innbau, on which precast

slabs with in-situ topping up to a thickness of 400 mm, double walls with a wall thickness of up to 500 mm and solid walls with a wall thickness of up to 140 mm can be produced.

An MFSR shuttering and demoulding robot from Sommer Anlagentechnik operates at the shuttering and demoulding position and can cope with a maximum production capacity of 6 pallets per hour.

Apart from setting and removing the shuttering, the MFSR robot also plots the outlines for built-in components on the pallet. It places removed shuttering in front of the automatic cleaning station for the lateral stop ends and, by means of an optionally usable active store, reusable shuttering is used for the next pallet immediately after cleaning without first having to be sorted back into the magazine.

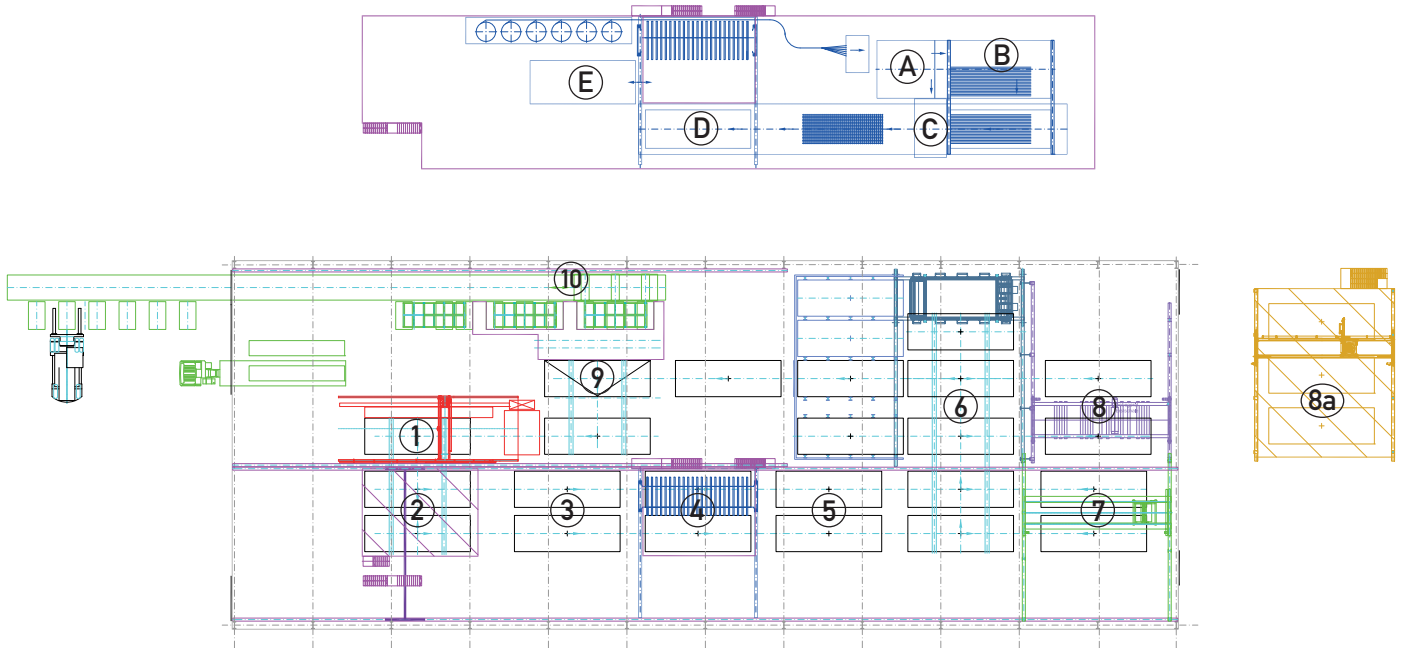
The complete processing of the steel takes place on two higher levels with machines and plants from progress Maschinen & Automation. The lattice girders in different versions are kept in a store and taken out when needed, cut to length and taken to the respective pallet, where they are manually placed in position. The lattice girder shears were similarly supplied by progress. innbau does not use standard meshes, but produces all required reinforcement meshes itself using the M-System Evolution mesh welding plant from progress. The required longitudinal and transverse wire is supplied off the coil, straightened and cut to length before being processed further in the mesh welding plant. While the individual meshes are produced in accordance with the requirements specified by the software from baubit, the master computer from SAA in turn organises the on-time and correct placement of finished meshes on the respective pallets to be worked on using a handling spreader bar.



The circulation system has areas divided over several levels for work that is critical to the cycle time, such as the turning of the double walls, smoothing or the production of insulated double walls. Other areas, for example for shuttering, installation of reinforcements and concreting, have double tracks in order to allow continuous working without changing pallets

Quality control by means of laser projection system

Pallets fitted with built-in components and the complete reinforcements are checked



- | | | |
|-----------------------------------|---|---------------------------------------|
| 1 Shuttering and demoulding robot | 7 Concreting / compacting | Mesh welding plant on the upper level |
| 2 Carpentry | 8 Turning station | A Transverse bar handling |
| 3 Built-in components | 8a Smoothing platform above turning station | B Longitudinal bar handling |
| 4 Reinforcement | 9 Tilting station | C Welding plant |
| 5 Laser / quality control | 10 Discharge cart | D Removal position with mesh crane |
| 6 Transfer area | | E Mesh buffer |

www.cpi-worldwide.com



Adaptability is
our Passion

SAA Engineering GmbH
Gudrunstrasse 184/4
A-1100 Vienna/Austria

T +43-1-6414247-0*
E office@saa.at

Intelligent Software Solutions
for Precast Concrete Plants

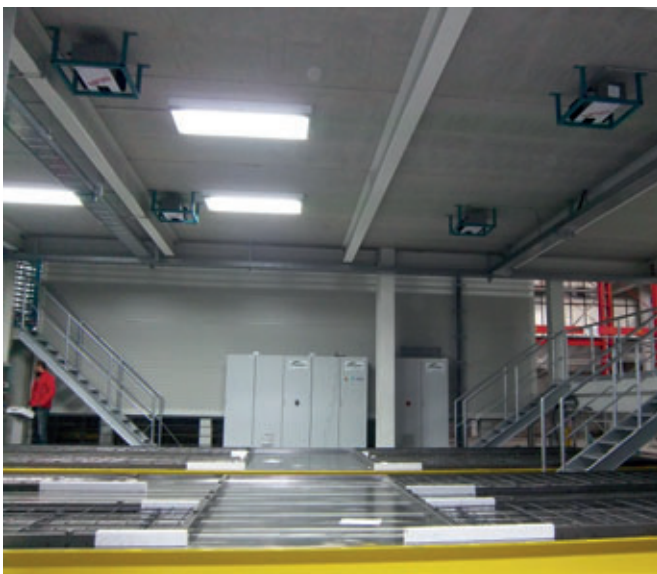
■ www.saa.at



The MFSR shuttering robot places the shuttering on the pallets with an accuracy of ± 1 mm. Later on the shuttering can be removed again automatically from the pallets just as fast as it was placed on them.



For the steel processing, which is located above the concrete processing, the steel off the coil is first straightened, cut to length and then processed further on the fully automatic mesh welding plant. The mesh store enables continuous and very efficient production by the steel processing plants.



The ceiling lasers enable the precise final checking of the elements to be concreted. The individual work processes that were required to assemble the pallet can be visualised by means of the control computer for the laser.



After a journey of less than 20 m the bucket conveyor from Dudik brings the concrete from the mixing plant in the neighbouring hall to the automatic concrete distributor, which fills the finished pallets with concrete. The subsequent compaction provides for perfect surface quality of the precast concrete elements, which is valued by innbau's customers.

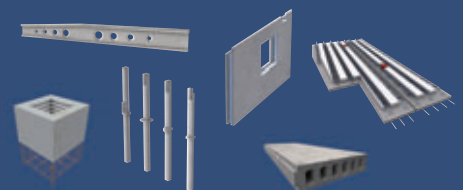
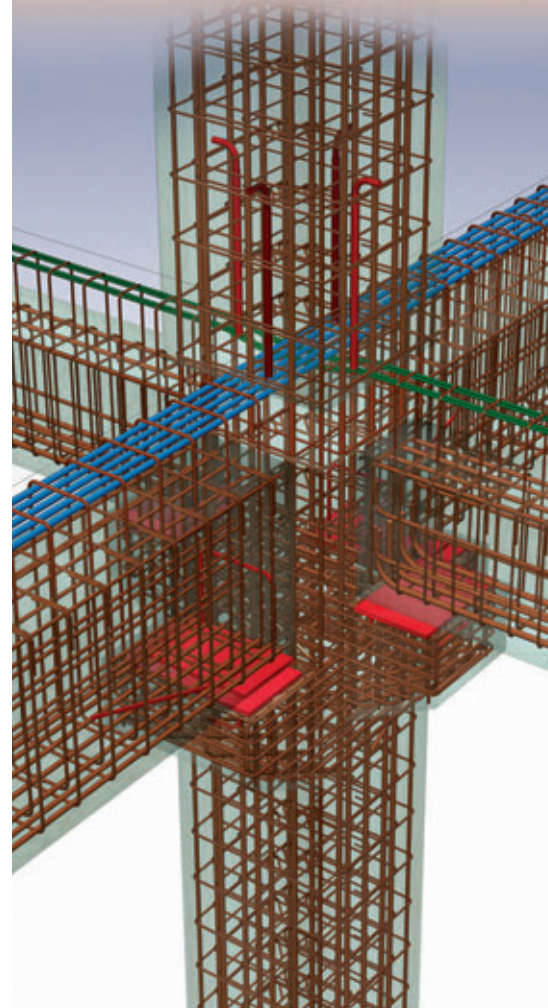
once again using a laser projection system before concreting. The control computer for the ceiling laser, which is located directly beside the workstation for the pallets, enables the operator to visualise the work processes, so that the complete configuration of the pallet can be reconstructed here step by step. This is made possible by the laser software being able to access the corresponding master computer data.

After the final check the elements are concreted at the Sommer concreting station; the concrete is delivered from the already previously existing mixing plant. This is made possible by a bucket conveyor from Dudik, which drives under the 1.5 m³ planetary mixer from Wiggert in the mixing plant and then serves the concrete distributor in the new double wall plant following a journey of almost 20 metres. The Vario-Swing compaction system on the concreting and compaction station operates particularly quietly in comparison with other systems, which considerably reduces the exposure of the employees to noise. In addition, the compaction ensures high-quality surfaces in fair-faced concrete quality on the shuttering side, which innbau's customers value a great deal.

The drying and subsequent treatment of the elements takes place in four rack towers with a total of 54 storage places, which are served by a fully automatic storage and retrieval machine. Right at the top of the hall, on a further level, three workplaces are already provided for a fully automatic smoothing facility, which is intended to provide for optimum surface quality on the filling side as well in the production of solid walls. In case of double wall production the optimum organisation of the pallet transport routes in interaction with the storage and retrieval machine is indispensable for high productivity. The hardened upper shells are removed from the hardening chamber and laid onto a freshly prepared lower shell on a turning station. The resulting element is compacted again and placed back into the hardening chamber. Finally, after hardening, the elements are removed, taken to the lifting station, placed in an upright position by a tilting device and lifted up. Ideally the finished elements are loaded immediately onto trucks or at least into transport frames, so that warehousing is barely required. The printouts of the pallet-accompanying plans created automatically by the master computer as well as the organisation of labelling help to correlate the elements correctly at all times throughout the production process as well as in the subsequent logistics in the warehouse or at the building site.

THINK
in new
Dimensions

Software & Services for the
Precast Concrete Industry



Nemetschek Engineering GmbH

Stadionstrasse 6

5071 Wals-Siezenheim

Salzburg / Austria

phone: +43 (0) 662 85 41 11-0

fax: +43 (0) 662 85 41 11-610

info@nemetschek-engineering.com

www.nemetschek-engineering.com



The hardening chamber with the storage and retrieval machine is located right next to the turning station

Highest requirements for product quality – but also for safety in the plant

Despite the high degree of automation of the plant, manual work steps may still be necessary for demoulding, the positioning of built-in components, the checking of reinforcements, compaction or the positioning of the upper shell on the lower shell. The plant safety concept provides for the individual activation and deactivation of separate automatic areas. The associated logic for this is freely programmable.

Hence, no rigid one-track safety concept is dictated. In fact, over the course of time, innbau can develop an entirely individual concept based on its own experience, enabling the highest possible degree of automation and at the same time maximum flexibility in the operation of the plant.

The safety concept is programmed using a controller that can access the master computer data and, conversely, can also influence the positioning of the pallets in the plant.

Modern on-line machine visualisation for the overview, error analysis and maintenance

A web browser and Internet access as well as theoretically any mobile terminal device such as an iPad is sufficient, provided one has the appropriate access rights, to bring the inner workings of the pallet circulation plant graphically onto the screen. The terminals of the master computer thus offer an overview of the state of the plant, current error messages and even details for each machine (e.g. the sensor-laden lifting traverse of the storage and retrieval machi-

ne) at all times. Hence, all plant information is continuously available, which enables particularly fast intervention where necessary and thus secures the high productivity of the plant.

Well equipped for the future

With more than 80 employees innbau produces and delivers precast concrete elements in southeastern Bavaria within a radius of around 100 km. innbau is outstandingly well equipped for the future with the new double wall plant, which represented a total investment of almost 8 million Euros. The customers, who mainly realise residential, commercial and hotel construction projects with the precast concrete elements from innbau, particularly value the very short delivery times and the just-in-time production.

In future the insulating double wall could become particularly important, especially in the aforementioned projects, on account of the energetic requirements for buildings. innbau is already equipped now for the production of such products with its new plant, and over 250 regular customers are proof of the trust placed in the continual quality of the products leaving innbau's works site every day.



The modern production facilities at innbau are continuously monitored on the terminals of the master computer – in principle, however, any computer or mobile terminal device with a web browser, Internet access and the appropriate access rights is sufficient to get information from anywhere about the state of the plant.



The storage area at innbau is hardly needed for precast slabs with in-situ topping or double walls, since these are produced just-in-time for the respective project and only the shortest stays in the storage area are usually necessary. In addition to precast slabs with in-situ topping and double walls, innbau also manufactures stairs and balconies for example, as well as all kinds of special elements required for the completely supplying of projects for residential and commercial construction.

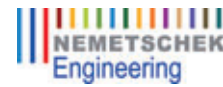
FURTHER INFORMATION



Innbau-beton GmbH & Co. Fertigteilwerke
Kraiburger Straße 1
84562 Mettenheim-Hart, Germany
T +49 8631 37700 · F +49 8631 377070
info@innbau.de · www.innbau.de



Prilhofer Consulting
Münchener Str. 1, 83395 Freilassing, Germany
T +49 8654 69080 · F +49 8654 690840
mail@prilhofer.com · www.prilhofer.com



Nemetschek Engineering GmbH
Stadionstraße 6, 5071 Wals-Siezenheim, Austria
T +43 662 8541110
F +43 662 854111610
www.nemetschek-engineering.com
info@nemetschek-engineering.com



Sommer Anlagentechnik GmbH
Benzstrasse 1, 84051 Altheim, Germany
T +49 8703 98910 · F +49 8703 989125
info@sommer-landshut.de · www.sommer-landshut.de



SAA Software Engineering GmbH
Gudrunstr. 184/4
1100 Wien, Austria
T +43 1 64142470 · F +43 1 641424721
office@saa.at · www.saa.at



progress Maschinen & Automation AG
Julius-Durst-Straße 100
39042 Brixen, Italy
T +39 0472 979100 · F +39 0472 979200
info@progress-m.com · www.progress-m.com



Dudik International
Kübelbahnen und Transportanlagen GmbH
Mackstraße 21, 88348 Bad Saulgau, Germany
T +49 7581 8877 · F +49 7581 4692
dudik@t-online.de · www.dudik.de



Software & Service GmbH
Gimpelstraße 3, 5302 Henndorf am Wallersee, Austria
T +43 6214 20175 · F +43 6214 20177
office@baubit.de · www.baubit.de