

Weckenmann Anlagentechnik GmbH+Co.KG, 72358 Dormettingen, Germany

## Extensive expansion of the DSK Grad precast plant in Russia

The larger the number of trades involved in the construction of a new plant, the more complex the coordination becomes. That's why many companies looking to enlarge their buildings and manufacturing facilities prefer an all-inclusive solution from a single source. That also applies to the Russian construction company Morton, who has built the new, gigantic DSK Grad precast plant near Moscow. In Weckenmann Anlagentechnik GmbH & Co. KG from Dormettingen, the building contractor brought in a specialist which, in the second phase of the construction project, namely the implementation of the stationary production, took over all tasks – from the project coordination to the transport and assembly.

The new DSK Grad precast plant belongs to the Russian construction and real estate group Morton. Founded in 1994 as a construction company, the Moscow-based enterprise was expanded by the property sector in 1997. Morton is now one of the top ten companies in its branch of industry. The construction company's new DSK Grad production facility boasts impressive facts. That is hardly surprising, however, since the company has set itself big goals: the annual production capacity for precast elements there is reported to be around 525,000 m<sup>2</sup>.

The new plant was built on a greenfield site on the south-western outskirts of Moscow. It encompasses a very large hall complex and an equally large storage area. We have already reported on the circulation plants, which are used there for the production of wall elements. Equally impressive, however, is the stationary production with which Morton manufactures concrete structural elements for multi-storey residential buildings, amongst other things. The company issued a separate invitation to tender for this area of DSK Grad. Weckenmann entered a bid and in 2013 was awarded the contract to completely fit out two hall aisles, each measuring 192 x 20 m.

The equipment includes three powerful overhead cranes, which serve a large number of formworks. A bucket conveyor supplies concrete to a bridge crane concrete distributor, whose discharge container features a lifting and turning unit. This is necessary so that the plant can cope with the various concreting tasks, because the discharge varies between laminar, linear and punctiform, depending on the job. The spiked roller/pusher concept of the new production facility is in turn characterised by simple operation, low wear and sensitive dosage. The transport of the finished precast concrete elements from the hall to the storage yard is performed by a rail-guided, radio controlled heavy-duty wagon. Its special feature: it is not supplied with power by a cable, but is instead driven by a gas generator.

### Bandwidth of supplementary structural elements

With the aid of the stationary production, a large number of precast concrete elements are produced at DSK Grad that supplement or support the "classic four walls" of residential construction. For instance, the manufacturer uses the three hydraulic twin beam form-

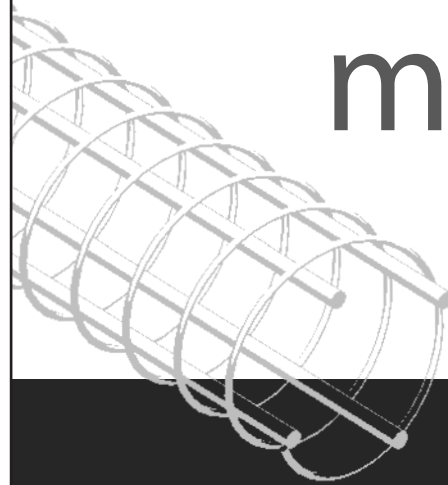


*Inline lift shaft formwork*

works from Weckenmann, each 75 m in length, for the manufacture of columns with and without corbels, as well as prestressed girders and downstand beams. So that the corbels can actually be formed in the desired places, the base and sides of the formwork are implemented as single, exchangeable steel walls. The base formwork can be adjusted in height in steps of 50 mm. The side formwork pieces have a stroke of 350 mm, allowing the manufacture of cross-sections from 250 x 300 up to 400 x 600 mm. The opening and closing of the formwork is child's play thanks to the adjustment



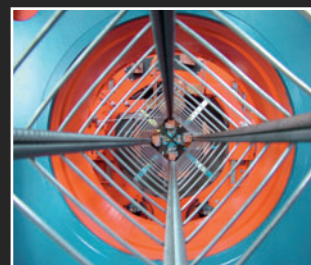
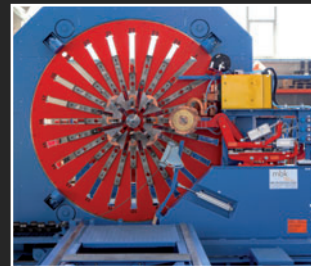
*On account of the building company's enormous construction capacities, up to 15 elevator shafts have to be produced every day.*



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The manufacturer uses the three hydraulic twin beam formworks from Weckenmann, each 75 m in length, for the manufacture of columns with and without corbels, as well as prestressed girders and downstand beams.

hydraulics. And: it is dimensioned such that it can accept the concreting pressure without additional mechanical locking.

The twin formworks are equipped with high-frequency vibrators, which are powered by two central frequency converters. Both can be operated by radio remote control. Moreover, the formworks are built on prestressing beds in order to be able to take up the tensioning force of maximally 6,120 kN per formwork. Permanently installed heating pipes fed with hot water heat the construction from underneath. A cover tarpaulin maintains the heat in the system, which is equipped with a heating controller that in turn regulates the temperature curve and heating duration fully automatically.

### Loadable connections

The storeys of the new building are connected to one another by lifts and stairs. The lifts for the transport of people have a shaft size of 2,980 x 1,970 x 1,820 mm. The shafts for the goods lifts measure 2,980 x 1,970 x 2,920 mm. On account of the building company's enormous construction capacities, up to 15 elevator shafts have to be produced every day.

Weckenmann has equipped the plant with steel high-volume formworks for this. They consist of a hydraulic retractable inner core and two mobile, angled outer walls. The cut-outs for the lift door are fixed magnetically in a defined place. The concrete is compacted by high-frequency vibrators, which can be remotely controlled by radio and whose speed can be adjusted from 0 to 6,000 rpm.

The formwork is equipped with a controllable hot water heating system, allowing the formwork to be used 1.5 to 2 times per day. An additional formwork base can be inserted for the upper and lower shaft elements, which are shorter than the standard storeys. The result: premium quality, monolithic, polymetric precast concrete elements.

Personnel can move on foot between the floors via ten-step staircases. They are 1,050 mm wide with a pitch of 150 mm and a tread of 300 mm. Weckenmann installed a 10-fold battery formwork in the DSK Grad plant for their production. Hot water heating and high-frequency compaction technology are integrated in the formwork. With the aid of an additional individual formwork, the concrete element manufacturer can also produce special stairs if nec-



Personnel can move on foot between the floors via ten-step staircases.



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essary. Depending on the desired stair width, the formwork base can be adjusted in height between 0 and 1,800 mm. The maximum number of 14 steps can be reduced by changing the positions of the vertical stop-ends.

### Architectural variables

The construction of modern residential buildings without balconies is barely conceivable nowadays - and that also goes for the new buildings designed by the planners at Morton. Therefore, the precast concrete elements produced in the DSK Grad plant also provide for balcony parapets - not least in order to achieve various architectural effects through the use of different forms and surfaces. Hence, one of the tasks of the Weckenmann plant technicians was to install two battery formworks with which ten different parapets with different heights and widths could be concreted at the same time. The outsides of the parapets are given special structures, which are achieved through the use of exchangeable form liners. Like the other formworks in the new production facility, hot water heating and high-frequency compaction are used here, too. Moreover, all moving formwork components are fitted with seals in order to prevent bleeding at the respective contact surfaces. This results in clearly defined, immaculate edges.

Architectural effects can be created even with varying façade elements. The circulation plant is used for wall and façade elements with standard dimensions. Four tilting tables are now available in the new production facility for all special laminar elements. They measure 4.5 x 14 m, have a load-bearing capacity of 750 kg/m<sup>2</sup> and are likewise equipped with heating and compaction technology. All of the tables are fitted with fixed 200 mm-high edge formwork; the other element sides are usually formed by wooden formwork fixed by magnet boxes and adaptors.

### Everything from a single source and perfectly matched

The conception of the stationary production, the delivery and installation of the required formworks and plant parts, tailored precisely to the needs of Morton or rather DSK Grad by Weckenmann Anlagentechnik GmbH & Co. KG, are only a few of the tasks carried out by the precast concrete specialists from Dormettingen for the Morton construction company. Following the completion of the constructive work, they are also assisting DSK Grad in word and deed after the start-up of production within the framework of



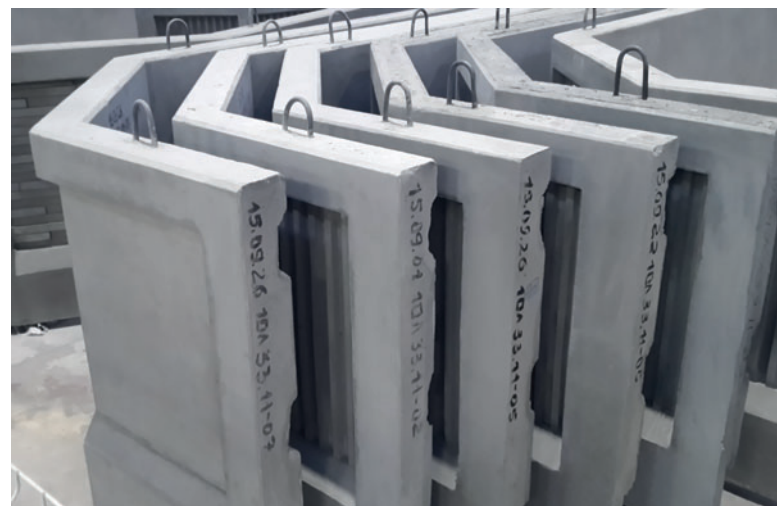
Four tilting tables are available for all special laminar elements

Weckenmann's service offering. That is also part of the plant manufacturer's promise of quality. In this respect the stationary production represents a consistent addition to the already existing circulation plants in the new DSK Grad precast plant. Doubly equipped in this way, the construction company can now get to grips with its self-declared goals and realise the large residential construction projects in the Moscow area that it is aiming for. ■

### FURTHER INFORMATION



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Morton achieves various architectural effects with balcony parapets through the variation of form and surface.