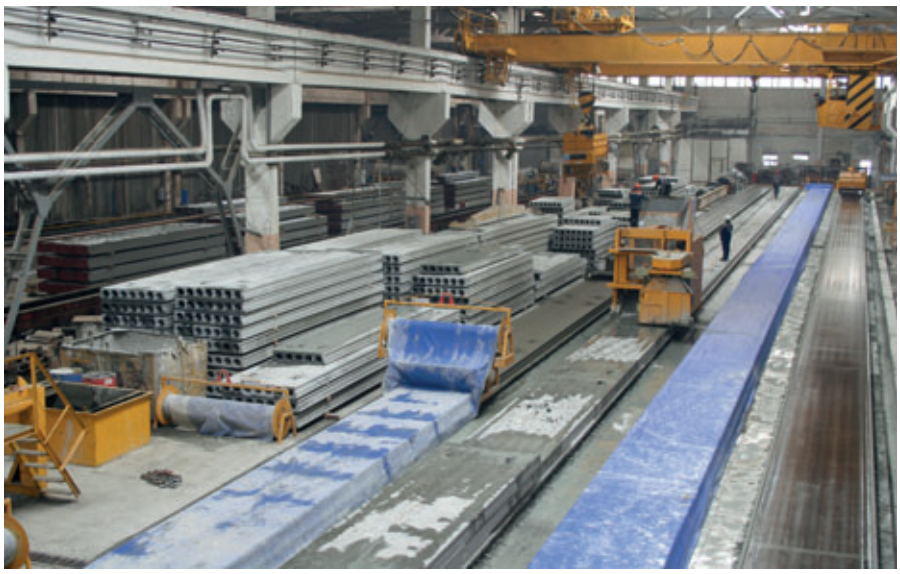
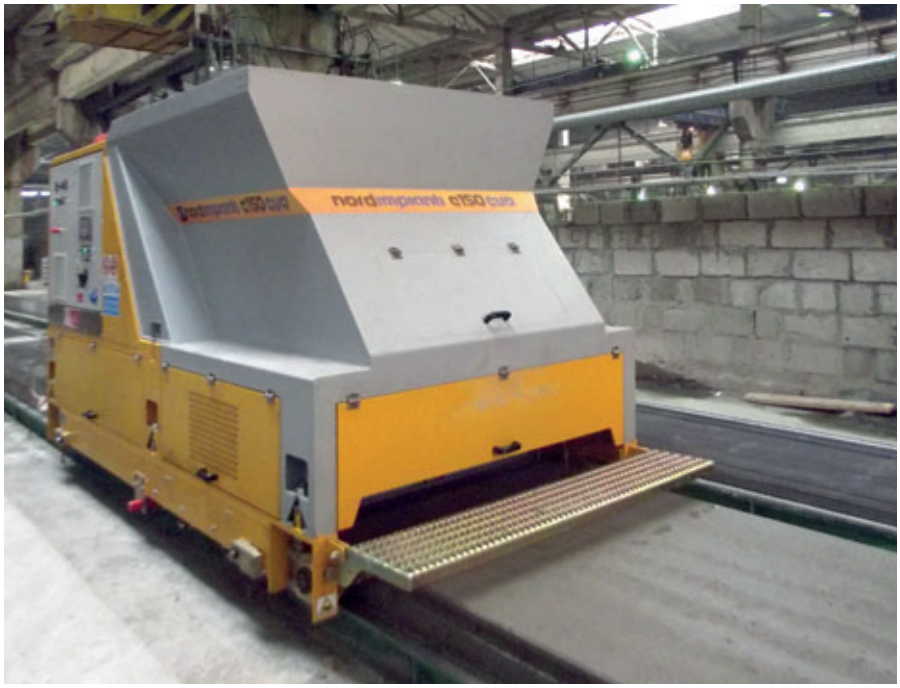
Nordimpianti System Srl, 66100 Chieti (CH), Italy

Successful Hollow Core Slab Production in Tyumen, Russia

Nordimpianti has completed yet another new production line, this time in Russia working with the company OJSC "Tyumenskiy zavod JBI-1". The new production line was commissioned in November 2014 and consists of 4 production beds, each 97 meters long with reaction beams at both ends of each bed. Production equipment was also supplied. This included: the Extruder evo150 series casting machine for the production of hollow core slabs 1.5 meters wide; an LPG multi-function Bed Cleaner for the cleaning, oiling and steel wire laying; a prestressing system; a multi-angle Saw for all types of cuts; lifting beams for concrete element storage; a bucket for the transportation and distribution of concrete within the plant. The plant is capable of producing 552 m² of hollow core slabs per work shift.



A general view of the JBI-1 factory in Tyumen city



Extruder technology offers the right solution to produce light-weight slabs with high strength characteristics.

JBI-1 was founded in 1959 and in 1995 changed its name to the present one after a substantial increase in hollow core slab production for residential purposes in the Siberia region. JBI-1 has gone through several changes and today is a modern technologically advanced production facility. From 1959 to 1967 the first production lines for the production of hollow core slabs were in place together with a new batching plant and a dedicated area for machine repair. The central building of the production factory was built in 1967 and is still in operation today. The administrative buildings and the production halls for steel works were developed between 1983 and 1995.

Production at that time reflected the demands of the Tyumen region, products such as columns and beams for agricultural buildings, Russian standard series hollow core slab floor elements, foundation piles, concrete elements for roads and others. These concrete elements produced by the JBI-1 factory were used in the construction of the city center of Tyumen for residential buildings and company production facilities such as TDSK, JBI-3 and Tobolpolimer. The year 2000 marked the beginning of a new era and starting in 2001 the first production line of the P-90.12-8 hollow core slabs series was commissioned. 2002 saw the start of prestressed concrete hollow core slab production using fixed moulds for residential and industrial building construction.

A leap in technology occurred in 2005 when JBI-1 introduced an Extrusion production line from another supplier. This produced hollow core slabs 1.2 meters wide without the need for fixed moulds. In 2012 JBI-1 decided to modernize this production facility for hollow core slabs and chose as its supplier the Italian company Nordimpianti which it had first met during the CTT exhibition held in Moscow in 2012.

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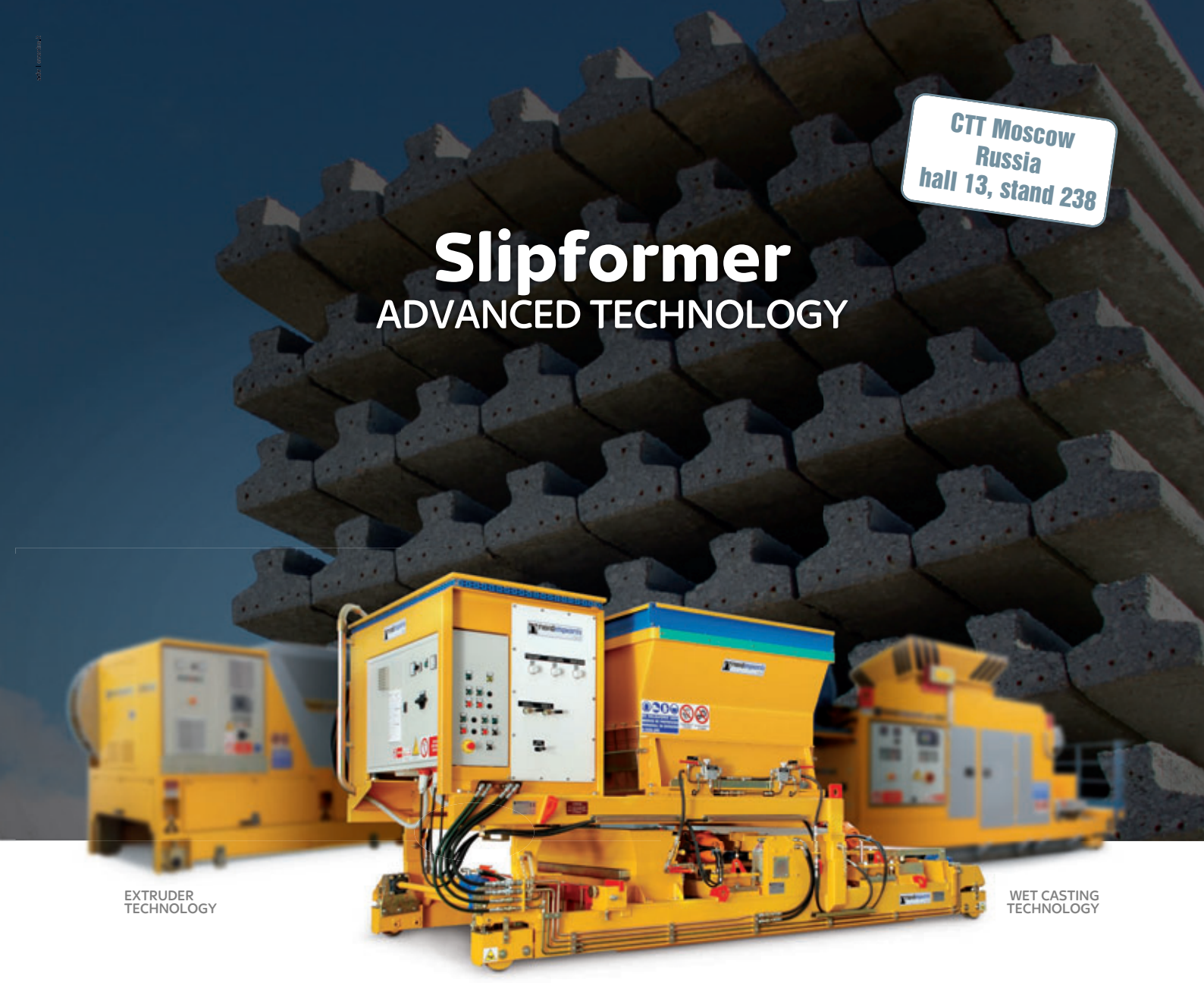
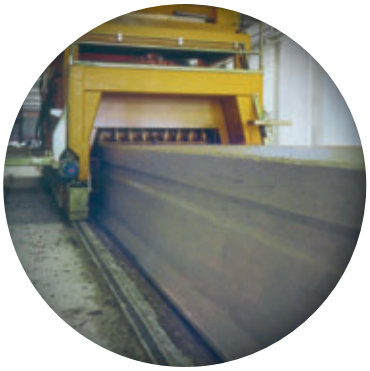


EXTRUDER TECHNOLOGY

WET CASTING TECHNOLOGY

The ultimate in performance from our range of Slipformers *sf* series



Performance
Production of prestressed concrete elements with heights up to 1000 mm.

Versatile
Wide range of elements that can be produced simply by changing the forming insert.

High quality finished product
The high compaction of the concrete is evident immediately after casting.

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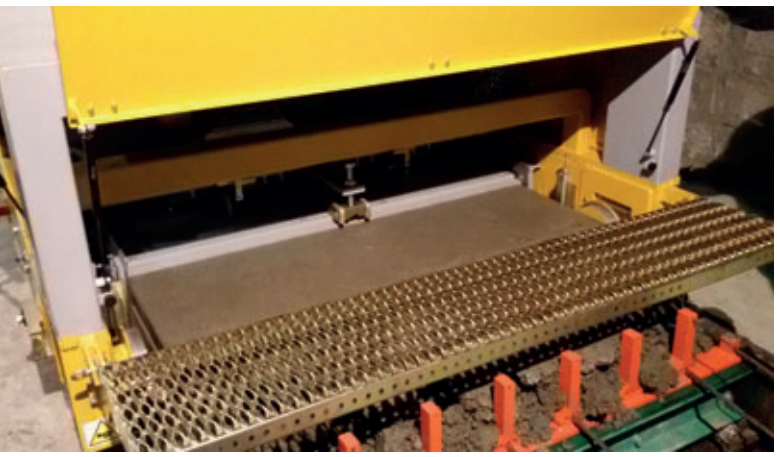
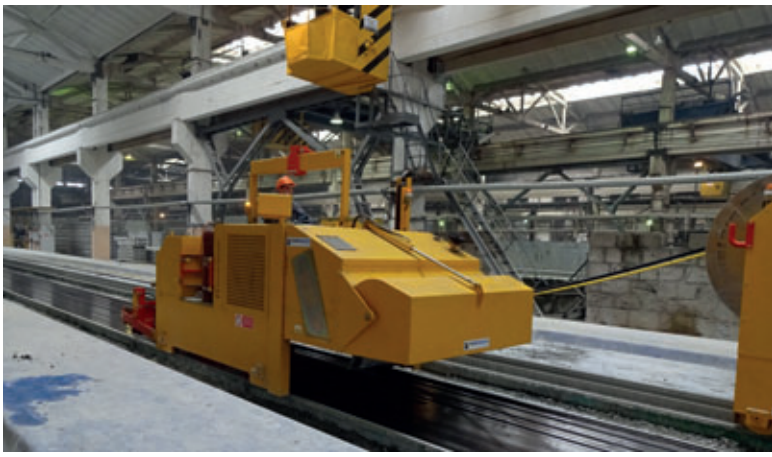


Extruder evo150 series casting machine for the production of 1.5 m hollow core slabs



LPG multi-function Bed Cleaner for the cleaning, oiling and steel wire laying

Reflecting on the decision Chief Eng. Ravil Akramovich Muchteev from OJSC "Tyumenskiy zavod JBI-1" stated, "Beyond the economic analysis of the advantages gained as a result of the introduction of the new production line, we carried out a technical comparison of the different suppliers of machines and equipment for precast concrete hollow core slab production. In the end, we decided to invest in Nordimpianti because we concluded that Nordimpianti was the right partner to produce tailored machines and equipment to match the concrete element specifications we require, for example, hollow core slabs being 1.5 meters wide"

A team of JBI-1 specialists visited several facilities across the Ukraine, UAE and other countries that work with Nordimpianti's machines and equipment. They also took the opportunity to visit Nordimpianti's headquarters in Chieti where the machines are built and assembled.

Multi-angle Saw for all types of cuts

Nordimpianti's 40-years experience in this field helped JBI-1 to achieve success in this project. The Italian company showed on this occasion that the real key to improve its expertise is the continuous research and development that it invests in its machines and equipment to make them the best on the market.

When Nordimpianti decided to produce the Extruder machine as its main machine for the production of prestressed concrete hollow core slabs, it made a very specific choice not to use a method of vibration concrete compaction but to achieve high compaction through the use the of shear compaction method.

JBI-1 's Director, Mr. Burlitskij V.V. commented: "Thanks to the shear compaction method used with Nordimpianti's Extruder it is possible to produce a wide range of hollow core shaped voids more closely following the desires of the Russian engineers and designers. Nordimpianti's Extruder gives us 3 main advantages: the cost-savings of raw materials, the freedom in the design of the hollow core slab profile and the ability to meet Russian engineering and building design regulations."

Hollow core slabs are an essential part of the precast concrete market. There are two methods in Russia to produce hollow core slabs: one that uses moulds and the other which uses technology without moulds producing concrete elements on long casting beds.

Using moulds allows the production of slabs with widths of not only 1200mm, but also of 1500mm and 1000mm. The production of these different concrete elements in the same factory gives flexibility and meets a wide range of architectural and structural requirements.

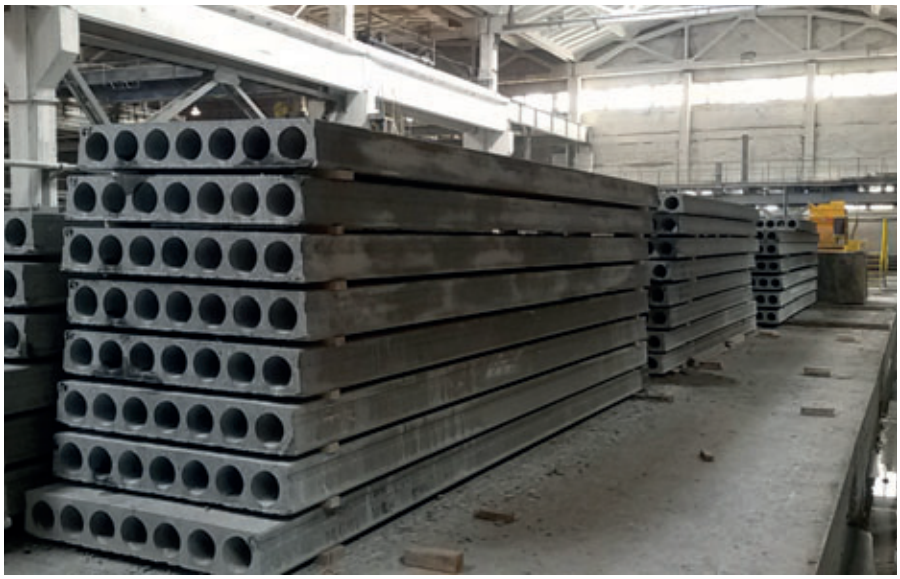
It is also possible to produce the same concrete elements but with even higher technical characteristics by using Extruder technology. The Extruder technology production method is widely recognized as the best choice based on experience from across the world.

This production method arrived in Russia from Europe together with the "European Standard" 1200 mm slab initially causing some problems in a country whose standard hollow core slabs are 1500 mm wide. Extruder machines cast elements on long beds, thus avoiding the use of fixed moulds and this technology can also be used to produce the 1500mm wide hollow core slab.

This is very important for the precast producers in Russia who previously produced 1500 mm slabs with moulds, now they were able to benefit from the many advantages of producing the same 1500 mm hollow core slab using the new Extruder method.

For precast producers in Russia the use of the extrusion method means the following: minimum element self-weight; low cement consumption; an optimization of resources for the curing process, something which is very important in Russia with its cold climate conditions in order to achieve the maximization of the daily production rate in terms of square meters per day.

Vladimir Sukhman, the Director – Chief Designer of "Research on Reinforced Concrete Laboratory" in Russia (NILJB) who developed technical documentation for Hollow core slab production declares: "One of most important parameters of hollow core slabs, besides the technical characteristics of the maximum span and load bearing capacity, is the self-weight of slab per square meter".
The Russian standard is a hollow core slab 220 mm high, 1500 mm wide. Usually the cores are round with a 160 mm diameter.



Hollow core slab stocking phase.

Load bearing capacity testing at the KSK factory Ivanovo city

The use of this 160 mm diameter never satisfied the precast producers in Russia due to the high self-weight per square meter. Producers tried to solve this problem and save raw material costs by increasing the diameter of the voids up to 170 mm. The problem is that increasing the voids to 170 mm is almost impossible unless steel mesh is used in the slab. Without this steel mesh the slabs can be susceptible to cracking that is not acceptable from a structural or architectural point of view and as a result the buildings will be considered defective.

Extruder technology offers the right solution to find a compromise between a slab being light-weight and having the correct strength characteristics.

Without using moulds the solution to the problem is to use the Extruder technology to achieve a slab profile with specifically designed and shaped holes. Precasters benefit from using this technology in two ways: raw material costs savings from reducing the self weight as though the slabs had 170 mm voids, and at the same time maintaining the same technical characteristics of a hollow core slab with 160 mm diameter voids.

Technically speaking the optimization of the cross section leads to a reduction of up 20% less reinforcement than average and concrete consumption up to 8% less than average (a cross section with 160 mm round cores is 0.121 m^3/m^2 compared to that of an optimized core cross section of 0.111 m^3/m^2)
After analyzing all these details and the effect that the new technology would have on the production facility, the company OAO "Tyumenskij Zavod JBI-1", decided to implement a new production line for 1500 mm wide prestressed hollow core slabs.

JBI-1's production line for 1.5 m wide hollow core slabs was not the first one in the Tyumen region. In 2009 Nordimpianti commissioned another production plant in Tyumen city, producing 1.5 m wide hollow core slabs with Extruder technology.

The start up of the second production line demonstrates the high potential of Tyumen city in the construction field and the region's economic growth. The cooperation between Nordimpianti and JBI-1 at all stages of the project was just the starting point of a relationship built not only between the directors of the two companies but also between the specialists of both the Italian and Russian companies.

Chief Eng. Ravil Akramovich Muchteev from OJSC "Tyumenskiy zavod JBI-1" added "Nowadays in our factory we are producing many different concrete precast element types. Our team is very specialized and there are some people who have worked with us for 20 years. Behind them we have also created a team of young engineers to maintain the success of our company"

Design and engineering are the real mission of Nordimpianti along with an excellent after sales service and the aim to give real support to customers at all stages of their projects.

FURTHER INFORMATION

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