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Modernizing a Plant with Extruder Technology

The growth of the construction market puts a lot of onus on building material manufacturers to find solutions that will allow them to produce concrete elements economically and with excellent technical characteristics.
With the aim to further reinforce their presence in the market manufacturers can look to make cost savings on aggregates, raw materials, electricity and labor costs but without sacrificing final product quality. This can be achieved through technical solutions offered by the modernization of existing plant.

Differences between a hollow core slab casted by vibration-based casting machine and a hollow core slab casted by Extruder.

Nordimpianti has wide experience in meeting this type of challenge and was chosen to implement the technical solutions by undertaking the project of the modernization of the "Kombinat Stroitelnykh Konstruktsij" (KSK) production facility in the Russian city of Ivanovo.

KSK has been a market leader in the production of construction materials in the Ivanovo region since 1976. Today it has a staff of around 200 people and production levels of 50,000 m³ of concrete elements. KSK supply 30% of all concrete elements for the entire region.

Originally KSK installed a complete production line for hollow core slabs based on vibration technology for concrete compaction. As the company earned an excellent reputation and acquired an in depth skill base of the vibration technology it started to consider the modernization of the plant in order to be able to produce hollow core slabs more efficiently and with even higher technical specifications than in the past.

After studying the different technologies KSK focused on the extruder machine and listed the advantages of the new system. They noted the following:

- The Extruder technology offered the minimum consumption of raw materials (concrete). This is because it works with a low water/cement ratio that gives the concrete element the structural stability it needs whilst maintaining the correct shape and having more voids than elements cast using machines that worked with vibration;
- The amount of concrete wastage at the beginning and end of the bed is minimized because the concrete is so dry that it does not cause spillage. Also there is no need to keep a minimum amount of concrete in the hopper, again keeping wastage to a minimum. The cost saving for raw materials can be as much as 20%;
- Cement consumption kept to a minimum due to the Extruder system being able to work with a stiff concrete mix. The cost saving for the cement can be up to 15-20%;
- The ability of the concrete elements to have a high structural resistance. Using a stiff concrete mix allows construction designers to use the concrete category from B30 to B50. This means that the hollow core slabs can be used in different construction fields, from residential to industrial applications;
- The curing time for the elements can be kept to a minimum ensuring that the productivity of the beds is increased whilst at the same time using the heat-

A low water/cement ratio that gives the concrete element the structural stability it needs whilst maintaining the correct shape.

The concrete elements will form the correct shape of the voids, without the voids collapsing during casting, indeed it is possible to walk on the surface of the element immediately after casting.

A key requirement of KSK was that the casting machine would have the ability to produce hollow core slabs of both 1200 and 1500 mm wide on the existing 1500 mm production beds.

Developments include the capability of producing new concrete elements with different heights and widths that allow quick installation and save time on construction projects in the residential and industrial fields.

ing process in the most efficient manner.

- The ability to use raw materials that the factory has already purchased in the past – the construction of the machine allows it to work with a wide range of raw materials (following the GOST's certificate needs) for example the type of sand and the size of aggregate;
- Better and consistent quality of the produced concrete elements. The concrete elements will form the correct shape of the voids, without the voids collapsing during casting, indeed it is possible to walk on the surface of the element immediately after casting;
- Reduced factory labour requirements. The machine only requires one operator;
- Less personnel needed for the bed preparation before the casting phase;
- In the plant a single stressing system is used with stranded wire and not single wire. The use of the strands means that a fewer number of cables is required and thus less time is needed for stressing. This reduces the bed preparation time before casting;
- Reduction of machine maintenance.

Having decided on the Extruder technology KSK needed to find a reliable partner and supplier for the machines and equipment that would ensure all the advantages listed above would be attained. The chosen supplier would also be required to build the casting machine that would work with the pre-existing beds and equipment already in use in the plant in Ivanovo city.

It is a very important plus for KSK to be able to offer to the market a wide range of products, thus satisfying the needs of different customers with different architectural needs and supplying a construction project with a high quality concrete product.

The partner that ticked all the right boxes was Nordimpianti. With almost 40 years of experience in the engineering field, the Italian company was able to meet the technical challenges and supply the customer with the best tailored solution. In November 2013 Nordimpianti commissioned a new Extruder machine in Ivanovo city at KSK. Nordimpianti's engineering department rose to the challenge and designed a specific Extruder to travel on KSK's existing beds and able to work with the raw materials and cement already in use by the Russian company. It is able to produce hollow core slabs 220 mm high / 1200 mm wide and 320 mm high / 1200 mm wide.

"This new Extruder machine means we can produce the same elements with lower costs and increased technical characteristics. This has opened up the chance to expand into other regions and increase our customer base," says Anatolii Morozov, General Director, KSK, Ivanovo city

The next step will be even more collaboration between the two partners. Developments include the capability of producing new concrete elements with different heights and widths that allow quick installation and save time on construction projects in the residential and industrial fields. The wide range of pre-stressed concrete elements that can be manufactured and the spans they can achieve give the construction experts freedom in their projects and this can take the construction field in that region in another level.

FURTHER INFORMATION

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