Nordimpianti System Srl, 66100 Chieti, Italy

SPC Industries kick off the production of a new type of hollow core slabs

SPC Industries is a manufacturer of precast concrete elements belonging to the parent company Kimlun Corporation with registered office in Johor Bahru, Johor, Malaysia. Since 2002 the company has been producing a wide range of precast elements for the industrial and infrastructural sectors. The manufacturing plant is located in Johor Bahru , southern region of Malaysia, as well as a branch in Sungai Gadut , central region of Malaysia both at a strategic position not only for the local building market but also for the ever-expanding market of neighbouring Singapore.

SPC manufactures products both in conventional reinforced concrete and prestressed concrete. Among the conventional reinforced precast components are concrete pipes, segmental box girders, building components and the tunnel segments. In the last 10 years 1.5 million tons of segments used for the construction of railway lines, motorways and other infrastructures have been produced. Among the prominent projects include the Sungai Buloh-Kajang & Sungai Buloh - Serdang MRT railway lines in Malaysia, and in various phases of Singapore the MRT Circle Line, Downtown Line, Thomson line and Cable Tunnel Projects. The production of prestressed concrete products consists of hollow core slabs for flooring with thicknesses ranging from 200 mm to 500 mm in height.

Extruder machine EVO120 during casting phase

Prestressed hollow core slab production dpt. in SPC Industries, Malaysia

Special hollow core slab production H 420 mm high REI 240

Detailed view: Hollow core slabs H 420 mm REI 240

The plant is equipped with 6 production beds of 150 meters in length and a production capacity of 1000 m² per day.

The hollow core slabs with a height of 400 mm are produced in standard and high fire resistant version: the production of the reinforced profile was launched in 2017 with the aim of satisfying particular construction requirements. In fact, just in Singapore, with the introduction of new construction regulations, the floors of the buildings must be designed with a fire resistance of 4 hours: for multi-storey buildings this aspect plays a fundamental role for safety.

The traditional hollow core slabs are designed and produced with a fire resistance REI 60-120 and in some cases also REI 180 obtained by distancing the prestressed reinforcement from the intrados or the surface exposed to the fire.

In order to further increase the degree of exposure to fire up to 240 minutes as required it was necessary not only to further increase this distance, but it was also necessary to work on a new geometric section of the cores, to allow compliance with the applicable concrete covers.

The important aspect in these particular elements is to maintain the load-bearing capacity of a slab of this thickness even though it has such high fire resistance characteristics.

In fact, as the resistance to fire increases, that is by lifting the prestressing strands towards the centre of gravity, the load-bearing capacity decreases.

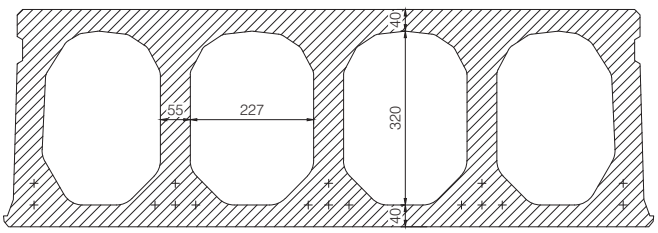
This research involved all the technical staff from SPC Industries that have carried out a long series of tests which confirmed that all the new codes were applied at the new concrete elements.

This technical study started from a standard hollow core slab 400 mm high, 426 kg/m², fire resistance 120 minutes. The new hollow core section has the following technical features: 420 mm high, 588 kg/m², fire resistance 240 minutes.

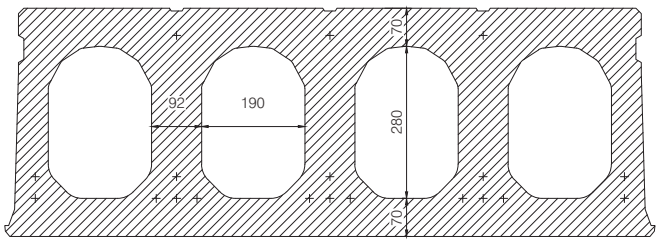
Engineers from Nordimpianti studied a new profile of the upper part of this new element: with longitudinal surface grooves, it is possible to increase the degree of adhesion key between the upper part of the element and the final in situ finish casting. To achieve this, the Extruder machine can lightly scratch the surface of the element during the casting process.

To produce a concrete element with all these technical features, SPC contacted once again Nordimpianti. In the past SPC already trusted the Italian company to purchase a complete line for hollow core slabs production.

(A)



(B)



(A) Standard version, (B) high fire resistant version (new section)

Stockyard for hollow core slabs

Production dpt. of precast segments for tunnels

This time, Nordimpianti helped SPC to contain their investment purchasing a set of accessories to be used with the existing Extruder Machine to produce this new and special element 420 mm high and REI 240.

SPC Industries received from Nordimpianti all the necessary assistance and help in this project from the starting phases of project development to the concrete hollow core slab production tests.

Some particular settings on the casting machine and on the concrete mix have been done before starting the production. Both companies, Nordimpianti and SPC, were satisfied at the end of the production tests.

SPC have always invested on the Singapore market with a growing internal demand in terms of quality, concrete element with high technical performances and fire resistance. SPC had this need to diversify the production searching for the quality of the service and the products. Nordimpianti have always been a leader in innovation and know how. Thanks to the great results achieved, both companies are fully satisfied and they can look at the future for further projects and market challenges together. ■

Application of hollow core slabs H 420 mm REI 240 for an industrial building in Singapore

FURTHER INFORMATION

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