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Interaction of innovative concepts in concrete block moulds to support an efficient production process in the manufacturing of concrete goods

The use of technically innovative solutions for a sustainable and thus cost and resource-saving production is of prime importance for concrete producers worldwide. To this end the tool for the manufacture of concrete blocks – the mould – must combine the most diverse aspects of an effective production method. It must be characterised by profitability for a long period of use, precision for high-quality products and innovative design for simple and fast repair in the case of wear. In over 20 years of research and development in co-operation with its customers, Kobra Formen GmbH has elaborated concepts for concrete block moulds that meet the aforementioned requirements for modern production.

■ Holger Stichel and Stefanie Schaarschmidt,
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Profitability

Surface hardnesses of up to 68 HRC – above-average in the industry – and a depth of hardening of up to 1.2 mm can be achieved with the Kobra hardness standards, allowing the manufacture of sturdy, wear-resistant concrete block moulds. Depending on the mould technology, different hardening methods are used in order

to support trouble-free production processes.

The “Optimill nitro™” brand describes the nitriding method, which is applied in particular for high welded moulds that are susceptible to distortion. This involves the enrichment of nitrogen in the outer zone of the material, whereby a change of the chemical composition is achieved. The resulting nitride layer is particularly hard and corrosion resistant.

Case-hardened moulds are given the “Optimill carbo™” or “Optimill carbo 68 plus™” label. In a thermochemical process the outermost zone of the mould is enriched with a carbon-emitting medium and subsequently quenched, i.e. hardened. After hardening the workpiece is tempered in order to reduce internal stress and to generate the required usage strength. Kobra works continuously to extend the hardness standards in order to improve the profitability of the mould as a tool for the manufacture of concrete blocks.



Model of the carbo hollow block mould from Kobra for Dubai Blocks



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Kobra service engineer during customer training for the exchange of wearing parts

Precision

Some years ago Kobra switched completely to milling technology as its production method. With "Optimill™" moulds all block contours are fully milled in the mould liner. This results in precise, absolutely straight and smooth surfaces that have a positive effect on the demoulding properties of the concrete blocks.

Simple and fast repairs

The simple and fast replacement of the wearing parts of concrete moulds is a fundamental prerequisite for continuous production. A modular structure of the tool is necessary for this so that individual parts can be simply changed. The example of Dubai Blocks L.L.C., in which the service engineers from Kobra carried out the exchange of a wearing part with integrated customer training, shows how this works and how the concrete block producer can carry out the repair himself.

Since 2012 Dubai Blocks has undergone a process of transformation under sole owner Mohammed Almulla in the course of which new skilled workers have been hired and new machines and technologies have been introduced, allowing the company to position itself in the local market as a quality manufacturer. Today Dubai Blocks co-operates with international partners such as Kobra and is actively involved in improving the tools and machines for the production of its concrete block products.

Kobra supplied the original mould equipment in 2013 following the realignment of Dubai Blocks. Dubai Blocks is focusing on technology, quality and service in choosing Kobra. The response to the hollow block moulds supplied has been consistently positive since their introduction. The close co-operation between the two companies ensures that the construction of the moulds is designed such that Dubai Block can perform maintenance with simple means.

The hollow block mould to be overhauled had already been in use for more than

250,000 cycles at the time of the repair, so that the frame parts of the mould bottom had to be disassembled and the tamper head mechanically and manually cleaned. With the further development of the Kobra hardness standard the carbo technique can now also be applied to high moulds, which enables a service life extension of up to 50 per cent in comparison to the nitro variant. The individual components can thus be used for a longer period. Kobra moulds are characterised by a solid design that enables the re-use of the mould frame and the tamper head.



Assembly work during the exchange of wearing parts

First of all the individual components and groups in the mould bottom are disassembled. This concerns the central section, the core holders and cores, the cover plates and the frame and is followed by intensive cleaning.

Following the mounting and fixing of the mould frame the mould bottom is rotated in order to fasten the "Singlebolt™" one-piece tamper head – a system developed by Kobra and proven over years of practice. These are supplied as pre-adjusted assemblies and are simply bolted to the tamper head base plate.

All bolted connections are executed with vibration-proof washers. Loosening of the bolts during the production process is thus virtually impossible. The carbo hollow block mould shows its strength if an accident does occur, however – each component can be replaced individually without grinding or welding. This system is unique in the market and is not offered by any other mould manufacturer.

After checking all the connections and performing a test run to check the accuracy of the fit between the tamper head and the mould bottom, the mould can be installed in the concrete block making machine again.

Dubai Block had already produced a further 50,000 cycles with this hollow block mould up to mid-May 2014.

The installation of the wearing parts can be executed by a skilled team with the corresponding tools within a day. Kobra offers the training as an option with the first delivery of wearing parts. Kobra customers are thus not only able to carry out mould maintenance quickly and efficiently; repairs following accidents are also possible in a very short time. Downtimes can thus be drastically reduced.

With the introduction of an improved core bar fastening Kobra has also succeeded in eliminating the last remaining weak points in the mould liner. By the targeted further development of the in-house 3D design and CNC manufacturing, Kobra has created a secure, distortion-free core bar fastener. As is typical for carbo hollow block moulds, this is directly accessible and can be exchanged using standard tools. ■



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