

■ **KobraFormen GmbH, 08485 Lengenfeld, Germany**

# Successful practical testing of new-generation cavity-block moulds

The new name for a dynamic, heavy-duty, plastic-metal composite between the mould frame and the mould insert is ITG (In Te Gral). Today, the (cavity block) mould assembly largely comprises a heavy, box-shaped welded structure consisting of a mould frame and a mould insert.

The ITG development has a mould insert vibration-decoupled from the mould frame in order to increase durability and strength under alternating dynamic loading. This solution using a parameterised design and material minimises the bending stress in the mould insert.

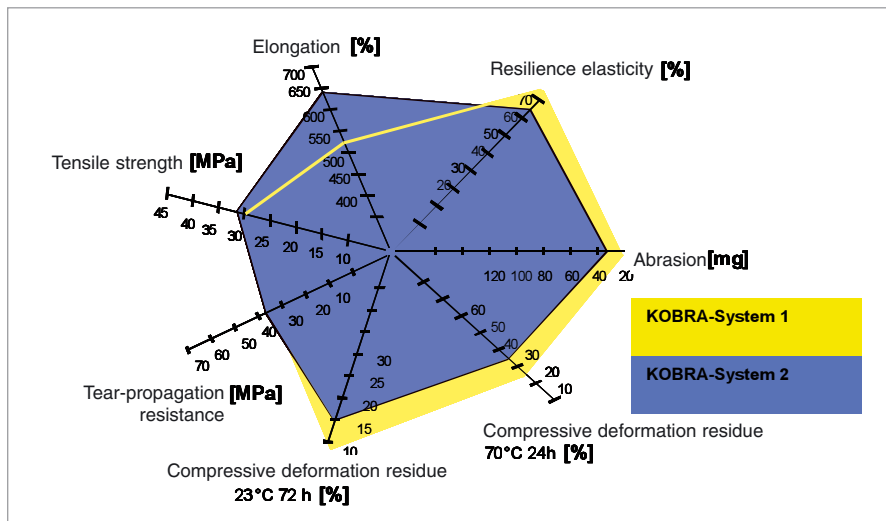
The development phases of the plastic-metal composite were implemented with several research and development centres. Plastic systems for use in cavity-block moulds have now been formulated after years of development with the research institute of Elastogran (BASF Group). With this mould design, the challenge was to analyse the existing solution and integrate new materials in order to extend the service life of the mould assembly.

The conventional steel frame has therefore been replaced by a plastic system.

The Kobra plastic systems shown in the picture can be defined according to the load case and insert version on the mould frame. The calculations in the non-linear case were established in different FEM



ITG technology on the cavity block mould assembly with components which can be replaced individually



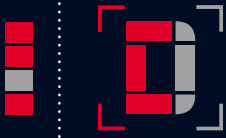
models by determining the material characteristics, such as the tensile strength, and verified in the test.

The components of the mould assembly, such as the core retainer, core, core mountings and the cover plate, can all be replaced individually.

The advantages are as follows: The core or core retainer can be replaced according to the damage, signs of wear or collision. Longer production downtimes due to (in some cases) elaborate repair work are a thing of the past.

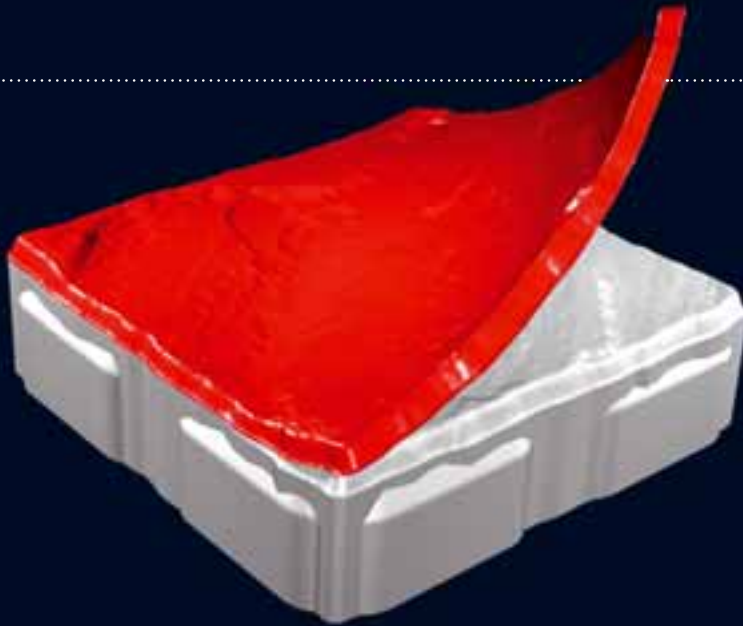
Because of the vibration stress and effect of the applied load during the vibration

Kobra plastic systems



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*Assembling the ITG mould assembly in the block-making machine*

process, the critical components in the mould assembly are the core and the core retainer.

In order to minimise these types of stress, the core is fastened to the core retainer via a newly designed vibration-decoupled bearing. The interlocking welded joint between the core and the core holder is no longer necessary. For the customer, the mountings of the core components have the additional advantage of being simple to assemble and dismantle in comparison to the welded design. The cores are mounted on the core holder with close-tolerance bolts, thus making replacement cheap and simple.

When developing the core assembly, particular attention has been given to the service life of the core retainer. By using a new material composition and additional heat treatment, according to a successful operational strength test, it was possible to achieve a service life which was within the fatigue-strength range.



*Careful production start with existing machine set-up*

### **Results from practical application and the test**

The newly developed ITG cavity block mould was subjected to practical tests at Fujairah Concrete Products, VAE. Here, high priority was given to comparing the conventional design with the ITG development. In order to analyse the load collective, the machine parameters for manufacturing the cavity blocks remained unchanged. The customer is therefore able to make optimum use of his experience and know-how when producing his blocks.

During this practical test, it became evident that, with the same machine set-up, the block strength and surface strength had increased by around 10%.

The customer was very impressed by this result and recognised in this new development even greater potential which he was keen to exploit for his product portfolio. The ITG concept and the replaceable core assemblies represent an enormous enhancement for his process sequence and quality assurance.

### **Future prospects and market opportunities**

ITG mould technology will have an important position in the international market where there is a high demand for cavity blocks. With the new moulds, Kobra intends to supply the mould assemblies with short delivery times and increased order quantities. Thus, an essential demand of the market for availability will be secured during the next few years. Endurance



*Description of how easy it is to put together the core assembly by Key Account Manager Andreas Günther*

behaviour and cycle times will be available with test customers during the first months of 2008 so that ITG technology can finally be ready for the market. ■

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*Visual block quality of the cavity block*