

# Determination of the optimum parameters for the process of manufacturing thin concrete slabs

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The Excluton company, which has now been on the market for about 30 years, is one of the most important producers of concrete blocks in the Netherlands. Its portfolio is very diversified. Excluton is geared to innovation and is very creative in the process. Many new products including large-format paving systems or wall facings are Excluton's own developments. The company's product range also includes particularly thin concrete slabs, whose manufacturing process is very demanding. Excluton consistently uses modern machine technology and high quality tools to guarantee the constant quality of all its products.

The concrete block mould (60 x 60 x 4 cm) shown in fig. 1 was developed and manufactured by Kobra Formen GmbH. Excluton and Kobra cooperate closely in the creation of new block systems, which already begins with the implementation of product ideas – frequently drawings or photographs – in products that can be produced with concrete block moulds.

Kobra's services include not only the product design and the production of the concrete block mould, but also numerous services connected with the use of the mould in the concrete block plant.

In this case the mould exhibited an above-average degree of wear in comparison with the number of cycles, therefore a cause analysis was carried out by two Kobra service engineers under real conditions, i.e. during the manufacturing process. In the manufacture of very low concrete block products it is essential to note that the stability of the mould is limited on account of its similarly low height and that the machine must be set up for a very precisely dosed application of force to the tool. In addition, the tamper shoes were manufactured with mini-chamfers in the specific example, which are subject to particularly high loads during production on account of the minimal super-elevation of the mould. A recipe with strongly abrasive raw materials also increases wear.

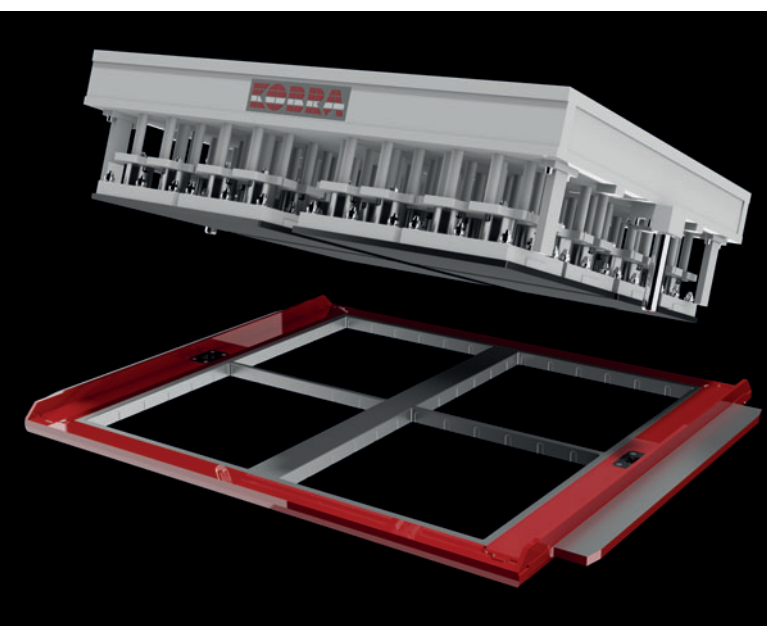


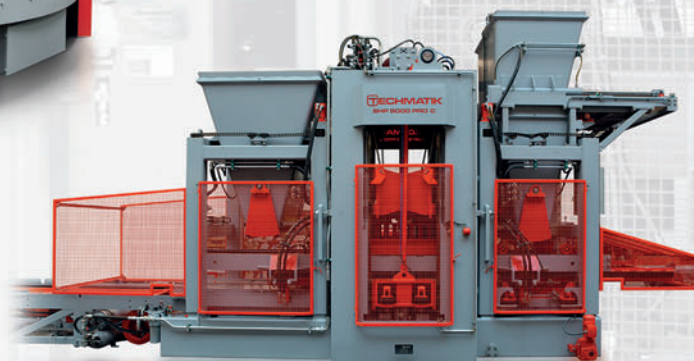
Figure 1: Slab mould 60 x 60 x 4 cm



Figure 2: Back stop measurement

beyond borders...

- Concrete production lines
- Product refinement stations
- Block making machines
- Concrete mixing plants
- Planetary mixers
- Molds for any machine



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Figure 3: Vibration measurement on the concrete block mould

Kobra's task was to analyse the machine settings in order to achieve a synchronous interaction of the concrete block mould with the production board.

To this end a vibration measurement was first carried out on the machine to rule out damage to the machine table. Attention was also paid to the adjustment of the back stops on the vibrating table, as irregularities can lead to fluctuating compaction results and, consequently, varying stone heights.

In the next step vibration measurements were carried out directly on the concrete block mould during the running production process with the machine settings chosen by Excluton.

In order to be able to analyse the positioning and the behaviour of the drag mould with respect to the board, photos were taken with a high-speed camera. These photos provide further important information about the wearing of a mould that is barely perceptible to the human eye but could be fundamental to the optimisation of the processes.

Following the evaluation of all the data, the machine settings were modified in accordance with Kobra's recommendations and the production sequence was examined again with vibration measurements and high-speed camera photos.

The results of the two measurement series were compared by Kobra and the machine settings adjusted in further test series until the desired result and thus manufacturing conditions tuned precisely to the product were achieved.

In cooperation with the two responsible employees from Excluton, it was possible in the example shown here to determine and calibrate the ideal parameters for the process of manufacturing concrete slabs with a low stone height. These parameters are not only essential for the product quality, but also verifiably reduce the rate of wear in the mould and machine. ■



Figures 4 a, b: Excluton concrete slabs



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