

Shaping tomorrow today

■ Andreas Gebauer-Günther, Kobra Formen GmbH, Germany

"Learn from yesterday, live for today and shape the future." This sentence aptly describes how the concrete block industry has made its way - and why it is now more dependent than ever on the innovative power of mold making. Both industries are closely intertwined: Progress in one area drives the other. Standing still would be a step backwards.

Change as a constant

In just a few decades, concrete paving stones and other concrete products have evolved from simple pavers to highly functional, creative and ecologically relevant building products. Formerly simple machines and molds that were mainly focused on functionality are now precise, sensor-controlled high-performance tools. Nowadays, processes take place both in the concrete block plant and in mold making that hardly anyone would have expected just a few decades ago. Behind every improvement is always the aim of increasing quality, avoiding downtime and providing customers with decisive advantages.

But the challenges are growing: Sustainability, energy efficiency, CO₂ reduction and increased expectations of flexibility and delivery capability are changing the rules of the game. Anyone producing today must be able to react quickly to changes in the market - with maximum precision and, above all, reliability. Future viability is not only achieved by investing in machines, but above all through partners who think about development and responsibility together.

Benefit and risk

Modern molds with a longer service life, precise machining and modular design reduce production costs and increase availability. At the same time, sustainable production is increasingly becoming a market access option: Public clients demand environmental and CO₂ certificates, customers expect resource-saving products.

Those who delay too long risk backlogs and have to accept higher life cycle costs and the loss of market share. Progress is therefore no longer an option, but a prerequisite for survival in a competitive environment. "Shaping tomorrow today" means not postponing decisions, but recognising and exploiting opportunities at an early stage.



AM-produced tamper shoes

From mobile block production to precision molds

The history of the industry shows how closely development and success are linked. Mobile block machines, which were primarily used to produce building construction products, were initially followed by multilayer machines for more effective paving block production with a smaller footprint. Developments in the market and the expectations of the concrete paving block surface finally paved the way for stationary machines that took precision and productivity to ever new



Printed cores without weld seam in mold insert

dimensions. At the same time, tools were developed that enabled increasingly differentiated products: functional spacers, drainage functions, colour mix surfaces and interlocking contours even on the underside of the stone. Molds with contoured draw plates or draw fingers for the internal profiling of concrete products are as commonplace in use today as tamper heads with heated tamper shoes and mechanically or pneumatically moved tamper heads for particularly special product surfaces.

In addition, surface treatments such as washing, blasting, grinding, bush-hammering or curling have considerably expanded the design possibilities in concrete block plants. As a result, concrete paving block became a product that was not only functional, but also aesthetically and ecologically convincing. Surfaces paved with paving stones have been part of everyday life around the world for many decades, although they are rarely consciously recognised.

The mold became the decisive quality factor. Over the past 3 decades, service life has increased from around 35,000 to over 100,000 cycles – progress that reduces downtime and cuts costs. A rethink has also long since begun when it comes to materials: Alternative binding agents are increasingly replacing cement in order to reduce CO₂ emissions and increase performance. Old concrete products have long been recycled to save valuable raw materials.

Each of these developments shows: Concrete paving block production and mold making are a joint system. Machines, materials and tools influence each other – and every advance benefits both sides.

Kobra as a development partner

Kobra Formen GmbH has established itself as a driving force in this interplay. Bolted molds with interchangeable wear

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*Exhibit at bauma 2025
- AM-manufactured tamper shoes and pavers produced with them*

parts, fully milled cavities and modular construction were already setting standards in the early 2000s. The idea: not replace the entire mold, but replace specific components. This reduces costs, shortens downtimes and increases planning reliability.

Modularity also creates flexibility: Tools can be adapted to changing product requirements without having to be redesigned or completely replaced. Start pavers, edge pavers or half pavers in the paver mold can be designed as an interchangeable cavity or changeable cavity. Depending on the requirements of the project, production can be easily customised. The simultaneous production of the different pavers has the advantage of less colour variation than if they are produced in different batches. Reproducibility and interchangeability guarantee consistent quality and precision in the mold tool. This gives concrete block plants the security of working with a system that remains constant over many years.

This philosophy has made Kobra a technological benchmark. The goal is clear: To supply tools that fulfil today's requirements and define new standards tomorrow.

New technologies - new possibilities

Additive manufacturing is fundamentally changing mold making. It does not replace conventional processes, but complements them in a decisive way. Highly complex components can be produced with less material and shorter lead times. Spare parts are available more quickly, and quality and precision are more reproducible than ever before. This also involves intensive rethinking and redesigning components that were previously subject to the technological constraints of conventional CNC production. In particular, designs with round geometries or particularly sharp-edged surfaces as imitation natural stone were limited by milling.

Kobra's own training workshop with machine equipment



Additively manufactured components with geroid structures are lighter and at the same time more stable than components made of solid steel and already make it possible to influence the vibration behaviour of molds. The results can lead to better compaction and higher product quality and – depending on the application – to shorter cycle times. At bauma in April 2025, corresponding mold components and also sample blocks were already presented; the advantages were immediately apparent. At Kobra, the future is already tangible and can be experienced.

Those who utilise the possibilities gain flexibility, efficiency and new scope for design. Those who wait will lose time and market share. Kobra follows a clear principle: Use technology where it creates measurable added value for the customer – through precision, reliability and future-proofing.

Sustainability as a commitment

Sustainability in the concrete block industry is no longer an additional topic, but an economic necessity. Kobra combines ecological responsibility with technical performance. A photovoltaic system with 1.8 MWp covers a large part of the energy requirement, a PV carport with over 2,200 modules supplies additional electricity and at the same time covers 180 car parking spaces.



Kobra AM team with printers

A circular economy is created in production: Steel chips and waste from conventional CNC machining are processed and the resulting primary material is used in several classifications for different additive processes – a contribution to truly low-emission steel. Molds can be recycled on a modular

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Björn Herborn, R&D Department
Masa GreyHUB, Andernach

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At Masa, we think of nothing but concrete – and how to shape it for the building materials industry. The machines we design and build are used for the production of concrete blocks, pavers or landscaping products, aerated concrete blocks and (reinforced) panels as well as sand-lime bricks. In other words, **we are real concrete heads with a passion for reliable, high-performance machines.**

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Björn, one of our clever concrete heads, has developed a tool for paver production lines that provides precise information about the quality of the ongoing production. On the wet side, the system measures products, identifies defects such as cracks, liftings or cement balls and helps you to reduce waste. **When it comes to precise 24/7 inline defect detection and resource savings – just ask the concrete heads.**

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Pure raw material is generated from the production waste

basis: Only worn components are replaced, the material of the old inserts and tamper shoes is recycled and reused in-house.

This way of thinking corresponds to the cradle-to-cradle principle (C2C). Additive manufacturing significantly reduces the use of raw materials and directly improves the carbon footprint. Only the actual loss of the total steel mass due to wear – i.e. the material that remains permanently in the concrete product – is assessed. System frames and tamper head adapters are reused and reduce the proportion of critical tool to a minimum.

The decisive factor is therefore no longer the pure mold price, but the ability of the mold maker to manage modularity and minimise the scope of replacement. Kobra's additive processes make it possible to produce the most complex wear parts quickly, precisely and with very little waste; quantities have an ever smaller influence on production costs.

Raw material recycling works in a similar way to waste glass: old components are sorted, shredded, melted down and remanufactured as high-quality components – with identical precision, quality and reliability. Kobra has long countered the need to work with mono-material by using bolted and replaceable wear parts. Welding is only used where it is still unavoidable – or when it is not a decisive factor due to the reuse of components.

Responsibility and continuity

At Kobra, sustainability is also reflected in the corporate culture. More than a third of employees were trained in-house and many have been with the company for decades. Experience, loyalty and knowledge ensure consistently high quality. With a vertical range of manufacture of over 95%, Kobra remains virtually independent of external supply chains – a clear advantage in times of global uncertainty.

A new addition: Kobra trainees in the production area are the first to complete an additional module on additive manufacturing and 3D printing. In this way, Kobra is consciously and specifically preparing its own crew for the future – expertise for new materials, processes and component geometries is created directly in the team and flows back into development, production and service without any loss of time.

In this way, the company combines ecological responsibility, social stability and technical independence into a reliable overall package. "Customers can be sure: Whoever works with Kobra not only receives a product, but also a piece of future security."

Shaping the future – together

The next few years will be characterised by digitalisation, alternative binding agents, new surfaces and advanced drainage systems. Concrete block products are already active and architectural elements of urban infrastructure – they store, filter and shape water management and serve as traffic guidance systems. Mold making provides the precision that makes such systems possible in the first place.



Kobra with 11 production halls and the new PV carport



*Tamper with geroid structure
for optimised force distribu-
tion*

Kobra sees itself not only as a supplier, but also as a partner to the concrete block plants – a partner that combines development, precision and sustainability into a common strategy. "Those who act today shape tomorrow. And if you want to shape the future, you need partners who share your vision."



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Additive and conventional processes are merging, boundaries between the traditional product types are disappearing. Whether paving, grass pavers or hollow blocks – in future, it will be function rather than form that counts. Modularity, reusability and resource efficiency will become the standard.

The future of the concrete block industry lies in the combination of technical innovation and corporate responsibility. It will not be decided by machines alone, but by people who are willing to try new things and support continuous development.

FURTHER INFORMATION



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