

Far more than a digital magnifying glass – quality assurance as an integral part of intelligent plant control

Fully automated, optical Quality control systems are becoming increasingly established in the block and paver manufacturing industry. However, Masa is going one step further with its system introduced in 2025: the combination of high-resolution image processing, 3D surface inspection and artificial intelligence is not used in isolation, but is seamlessly integrated into the Masa plant control system. The result is a system that not only provides monitoring, but also enables operators to intervene quickly in the production process and optimise it by linking the device to all plant data.

Masa's integrative approach combines image processing, process data and control logic into an intelligent overall system. At a time when production processes are becoming increasingly complex, quality requirements are rising and flexibility is becoming a decisive competitive factor, existing staff must also be optimally supported. This calls for a new way of thinking. The key lies in technology that both monitors quality and combines human capabilities with precise digital support, thus becoming a real game changer.

Quality control: Precise sensor technology for defined quality

Quality control demands a trained eye – precise, consistent and reliable. At bauma 2025, Masa presented its technical solution for automated, optical quality control that meets precisely these requirements:

Positioned directly behind the production machine on the wet side, the system performs contactless measurements on freshly manufactured concrete products in-line – without interrupting the production flow. While the production board with the products is continuously transported onwards, the system records precise measurement data in real time.

Operators can define tolerance limits according to requirements and product specifications. The system detects a wide variety of product defects and distinguishes, for example, between actual surface defects and contamination.

All detected exceedances of the set tolerance limits are visualised and classified in the Masa plant control system, and the affected products are clearly marked. In addition, the system measures the product heights across the entire production board and displays the height profile graphically – co-

Masa Optical Quality Control: Facts, figures and data

Sensors and detection

- Height measurement accuracy +/- 0.5 mm (product height 25 - 500 mm)
- Surface defect detection from a size of approx. 1 mm²
- Detection of lifted areas on the surface with a height difference of approx. 0.5 mm
- Detection of fine cracks from a width of approx. 0.5 mm
- Detection of edge breakouts
- Detection of smooth inclusions (e.g. gravel grains, paint lumps or cement balls) or faulty smooth surfaces caused by cement on the surface
- Detection of colour defects in coloured products (current batch comparison)
- Differentiation between surface defects and impurities

Intelligent image processing with AI engine

HMI - Human-Machine Interface

- Fully integrated into the Masa plant control
- Uniform user interface in Masa design
- Visualisation possible on every Masa control panel in the plant
- Optional monitor for the sorting station on the dry side for precise display of products to be sorted

Integrated documentation

- Automatic storage of result images (defect detection, height measurement)
- Raw data storage possible on request

lour-coded according to the defined tolerance ranges. When combined with optional weighing devices, the system calculates the average bulk density of a stone layer, thus providing valuable information about product quality.

One system, one interface, full control

Masa adopts an integrative approach in its plant control concept. For this reason, the Masa optical quality control system for new plants is fully integrated into the Masa plant control software. In younger existing Masa plants, the system can usually be retrofitted without any problems and fully integrated into the plant control system. Integration is also possible in older Masa plants or third-party plants, but requires prior technical testing and, if necessary, a control upgrade.

Operators have direct access to all measurement results at the control station and can respond immediately if required, without needing to walk to the traditional control station. Defect images and stone height deviations can be statistically recorded and evaluated.

Standardised user interface for maximum process reliability

For the plant operator, this means that the uniform and intuitive user interface enables efficient interaction with the entire

plant as well as individual components, such as optical quality control. This applies regardless of the complexity of the respective block and paver production plant.

All relevant processes - from dosing and mixing to product manufacturing, quality control and curing to product packaging - can be controlled, monitored and visualised on any Masa control panel in the plant via a uniform HMI interface in the distinctive Masa design. This ensures consistent operating logic, high process reliability and transparent plant communication.

Detecting faults early - producing marketable products faster

Identifying faults is the first step towards efficient production. Successful companies go further: they learn from faults and turn challenges into opportunities. This is exactly where Masa comes in with its holistic system. It not only offers precise quality control, but also opens up new possibilities for process optimisation and increased efficiency.

On the wet side, the quicker the machine operator responds to product faults, the less waste is generated - and the faster saleable products are produced. When switching to a known product or recipe, the system automatically displays all corresponding parameters such as defect tolerances or product

masa GreyHUB

Milestone to your success.

A genuine solution is not just to detect the smallest surface defects, but to prevent them through improved processes.

“My milestone enables fast optimisation of your production processes.”

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.**



NEW Masa Optical Quality Control System

Björn, one of our concrete heads, has developed a tool for paver production lines that provides accurate insights into production quality. On the wet side, it measures products, identifies defects such as cracks, liftings or cement balls and helps you to significantly reduce waste. **When it comes to optimising production processes, just ask the concrete heads.**

height to the machine operator. As the results of the optical quality control are displayed directly on the control panel, the operator can adjust settings immediately and achieve the desired quality more quickly.

When producing new products for the first time, the machine operator benefits from a convenient copy function within the product management of the Masa plant control software. 'Search for and copy a similar product recipe, adjust one or two parameters, run it - it's absolutely easy!' says one machine operator, describing his experience of running-in a new product. 'Our run-in time, including fine-tuning, has been significantly reduced.'

No time-consuming teaching process is required for new products in the Masa system.

Ensuring quality with auto-stop and smart control

Experienced machine operators often take on numerous additional tasks alongside production and are not at the control station around the clock. This becomes problematic when an unplanned drop in quality occurs during a planned absence - and the production machine continues running regardless. For this case, the Masa plant control offers a configurable auto-stop function: if the quality control detects a defined percentage of defective products, the machine shuts down in a controlled manner. This avoids unnecessary waste and increases production reliability.

In addition, the machine operator can mark the production boards via the control system. Depending on the percentage of defects on the production board, this can trigger further intelligent processes:

- **Tilting device:**

The downstream Masa tilting device completely tilts the marked production board with defective products while they are still fresh, preventing them from entering the chamber system for curing and occupying storage capacity.

- **Marking as second-choice products:**

Alternatively, production boards with second-choice products can be marked. Although they remain in the ring, cost-intensive stations for surface treatment are automatically deactivated during the run.

These functions are based on the digital board ID - a central component of Masa's integrative control approach.

Masa Board ID instead of RFID - smart data management for production

The board ID is a unique, sequential number that is automatically assigned by the Masa plant control system to each production board as soon as it enters the block and paver production machine. Thanks to this technology, the time-consuming and costly retrofitting of production boards with dig-

ital signal transmitters such as RFID chips is completely eliminated.

Like every other process step within the production plant, optical quality control generates a significant amount of data. Data transfer between the various processing stations in the plant can be carried out using different technical solutions. Masa relies on data transfer using so-called data telegrams in combination with the board ID. Data telegrams are standardised data records that accompany the production board digitally throughout the entire plant. Logging takes place at every station where relevant process steps take place and information is generated.

The Masa plant control system can link various data sets to the board ID - ranging from simple information to complete information packages containing product data, recipes and other parameters. This also includes the log for each mixture, documented via a unique mixture ID.

Depending on the option selected, Masa thus provides detailed insights into the individual production plant:

Chamber preview - real-time quality overview for the machine operator

The 'Chamber preview' function gives the machine operator a quick, intuitive overview of the quality status of the products



Chamber preview with visualisation of the percentage of rejects per production board

currently in the curing chamber – in real time and differentiated by each stored production board. Each chamber position is visually displayed, showing the percentage of rejects.

Short-term benefit:

The operator can flexibly adapt the removal sequence to the current situation – for example, during staff shortages in the sorting area on the dry side.

Medium and long-term benefits:

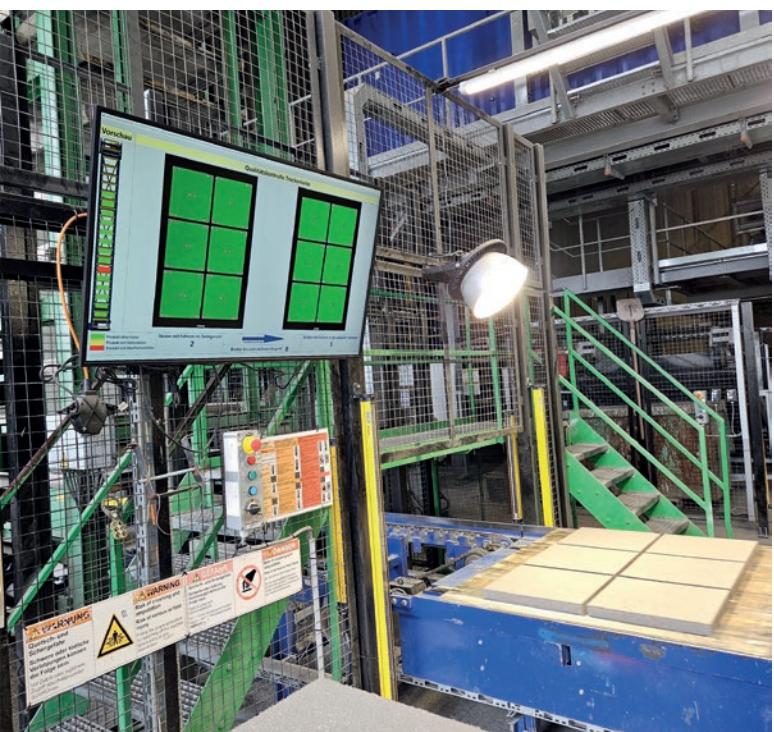
Evaluation per production board and assignment to the respective production shift enable further analyses, such as:

- Identifying fluctuations in raw material quality
- Identifying training needs for personnel on specific shifts

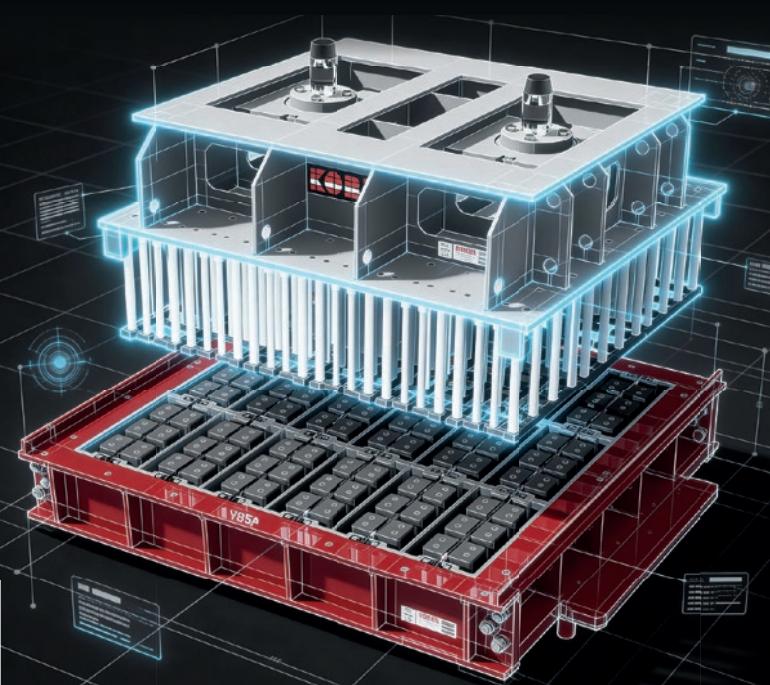
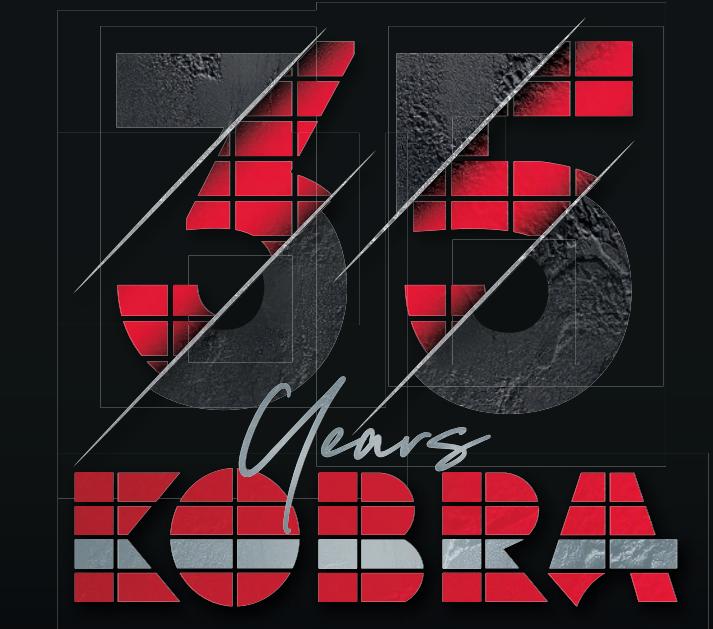
Ensuring product quality with data-based final inspection

The more convenient the final inspection on the dry side is, the more efficiently it can be carried out. Manual sorting of individual defective blocks and pavers at the QA station is supported by a dedicated monitor. Thanks to the board ID, which seamlessly transfers quality data from the optical quality control on the wet side through the curing area to the dry side, staff at the QA station receive a real-time display of the products on the current production board.

Defective products are clearly colour-coded and can be replaced manually in a targeted way. This contributes significantly to increasing the delivery quality of the finished product layers or complete pallets. Masa is already working



Convenient quality display with separate monitor on the dry side



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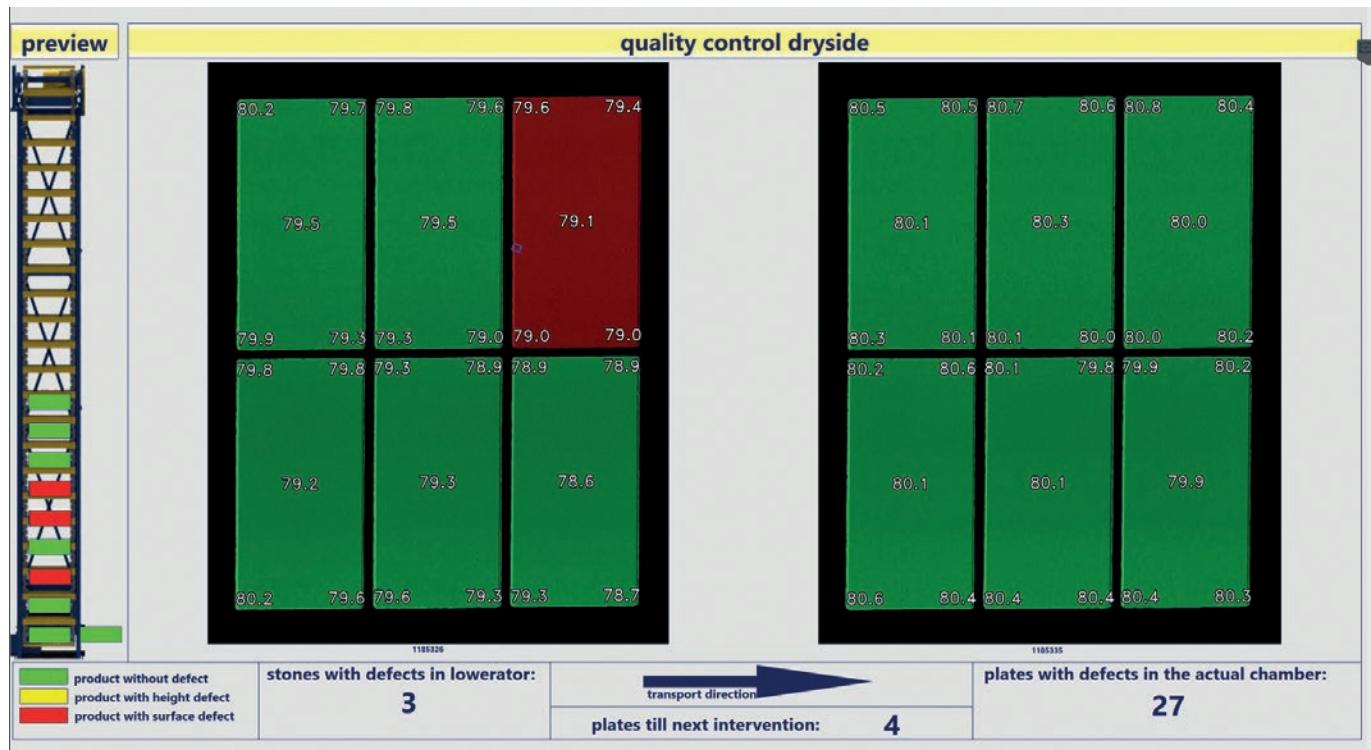
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Lowerator preview and display of the current production boards at the QA station on the dry side

towards an automated solution for quality sorting on the dry side and is developing various approaches with different levels of automation.

Work scheduling – more flexibility for staff!

Masa has integrated an additional convenience feature for the personnel on the dry side: the 'Lowerator preview' function provides the operator with advance information on the production boards currently in the lowerator and being cycled step by step to the dry side.

Production boards requiring manual intervention are highlighted in colour. The operator can also see how many defective products are in the lowerator and how many cycles remain until the next intervention.

This enables work to be planned and organised efficiently until the next necessary intervention – for example, emptying residual containers, carrying out cleaning tasks or refilling products for sorting.

As on the wet side, Masa also offers a configurable auto-stop function on the dry side. This ensures that no production board containing defective products enters the packaging process unnoticed.

Secure data storage and reliable support

Masa stores all data on-premises – directly within the customer's IT environment. The information is not stored in an external cloud but remains entirely within the company. This ensures that the customer retains full control over sensitive production and operating data at all times – a decisive advantage for concrete block and paver production, where reliability and data protection are paramount.

All services are supported by qualified specialists based in Germany. They have extensive experience and speak at least German and English, ensuring clear, professional communication – both nationally and internationally.

Masa provides a 24/7 technical support hotline. Based in Germany but accessible worldwide, it ensures customers receive rapid assistance at any time – regardless of location or time zone.

The combination of local data storage, technical expertise, bilingual support and constant availability ensures maximum security, stability and trust – allowing customers to focus entirely on production.

Creating new perspectives for tomorrow's production

With optical quality control, Masa is opening up new perspectives for tomorrow's production. Marcel Helsper, Technical Director at Masa Andernach, describes the vision as follows: 'Masa optical quality control is much more than a function – it is our ambitious step towards intelligent networking and increased efficiency in production, aligned with Industry 4.0.'

The focus is on analysing production data to determine optimal parameters, supplemented by clear recommendations for operating personnel and intelligent assistance functions to support informed decisions. The aim is to increase production output over the long term and make processes future-proof.

Further research and development projects at Masa will drive this vision forward, signalling the next step towards smarter, networked manufacturing.



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Masa GmbH
Masa-Str. 2, 56626 Andernach, Germany
T +49 2632 9292 0
info@masa-group.com
www.masa-group.com



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Phone: +1 (646) 2860014 - sales@wuerschum.com

wuerschum.com

Tel.: +49 711 448 13-0 - info@wuerschum.com

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