

Tracing sources of error

How high-speed cameras reveal errors in plant operation

Plant operators are often faced with a puzzle: What causes unexplained shutdowns? What are the reasons for unanticipated wastage? Our high-speed cameras are able to record even very fast system processes and deliver high definition videos of the error. Frame by frame, they help you to solve the mystery.

Faster, more reliable, more efficient – the demands on modern production systems continue to rise. They are supposed to run continuously and provide consistently high quality. This is not just what the customer expects; it is also what the plant constructor promises. However, in practice plant operators can rarely run their plants at their full potential. The reasons for this are manifold. Tools and equipment wear out, demands grow, or products and employees change.

However, in some cases, the causes cannot be explained. Operators have to run their facilities at

speed for reasons unknown. If the systems do not run optimally, the return on investment remains below expectations. Therefore, it is important to promptly and reliably identify the sources of error.

Visualizing faulty processes

This is where the Mikrotron high-speed cameras come into play. They make production processes visible. Filling systems for beverage production, presses for sheet metal processing, packaging machinery for food production, pharmaceutical labeling systems, robots in the automotive industry – our high-speed



Errors occur at different system components:

1. Labeling machinery at VARTA equipped with a MotionBLITZ® Cube
2. Pick-and-place assembly of drug-dispensing systems at Rexam Pharma GmbH analyzed using the MotionBLITZ® Cube3
3. Wine-bottling plant 4. Thermoform machine 5. Versatile double-sided press

slower than planned speeds because of unexplained excessive wastage at target speed. Or the facilities deliver satisfactory quality, but there are irregularly occurring plant downtimes at regular production

cameras can be used successfully in nearly all industries. Documenting faulty processes at a frame rate of up to 20,000 frames per second. The videos recorded can be played more slowly by a factor of

20 to 50. Thus, with the help of software, the processes can be visually analyzed frame by frame. Sources of error can be found quickly and reliably.

Distinguishing between image processing and high speed

Image processing cameras and high-speed cameras are often found in the same plant. But they fulfill completely different functions. Image processing is responsible for quality control. It ensures that no defective parts, which may lead to claims for damages, are delivered. Image processing is therefore a form of assurance.

High-speed cameras document processes for plant operators, allowing them to analyze in detail and thus exploit the potential of each plant. The value added per plant can be brought up to the originally planned levels. In many cases, the documentation process makes it possible to boost productivity levels beyond this.

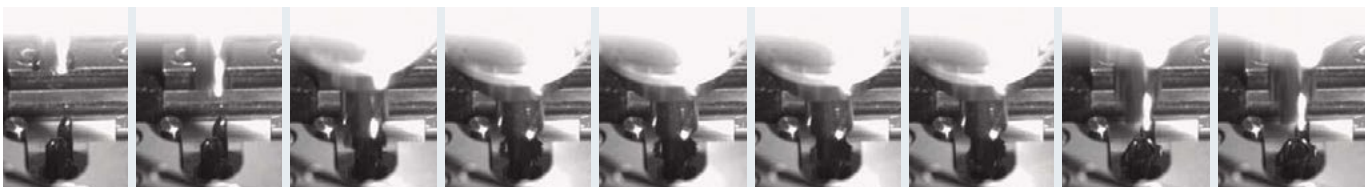
Picking the perfect camera

The MotionBLITZ® high-speed recording cameras are specially designed for use in difficult conditions. Even with a lack of space, poor lighting, temperature fluctuations, vibrations and high demands on recording times they deliver precise images of fast processes.

Cameras for the tightest spaces

The structure of your plant will determine how much space is available for the camera. With dimensions of only 63 x 63 x 64.5 mm, the MotionBLITZ EoSens® mini camera can also be installed in very cramped spaces. These small cameras offer the technical performance of the larger cameras. More designs are available with the MotionBLITZ® Cube series or the EoSens® TS3 high-speed cameras. The field of view is determined by the selection of the appropriate lens.

SEQUENCE EXAMPLES



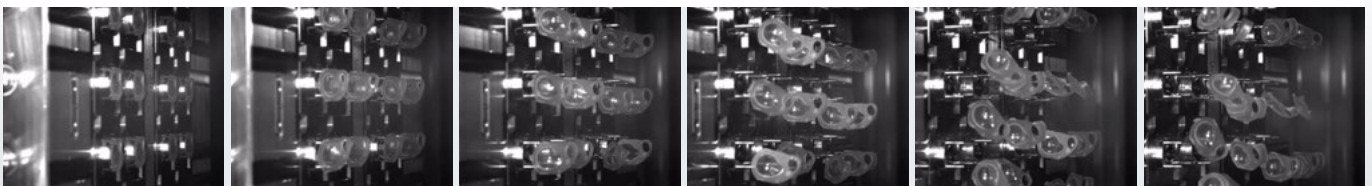
Plant procedures at Rexam Pharma GmbH

Within 6 months after the acquisition of the MotionBLITZ® Cube3, 25 slow-motion studies of various plant procedures were performed.

Among them was the lifting and placing of small disc springs in the fast pick-and-place process.

The sources of error were detected in the course of 20 slow-motion studies, which revealed the correct approach to optimization.

"The results clearly exceeded our expectations," commented Martin Back, Production Area Manager at Rexam in Neuenburg.



Optimization of the pressing process of blister packs for one-day contact lenses

On the pictures you see the production of the cover, the so-called blister pack. This pressing process kept faltering, as one blister pack repeatedly got stuck on the pin. The recording gave us helpful hints on problems, and helped the customer to optimize the output timing.

The MotionBLITZ® Cube2 camera recorded 500 frames per second at a resolution of 1,280 x 1,024 pixels.

Watch this [video on the Mikrotron site](#) (Category Industry: „Ejection of workpiece from a compression mold“)

Optimally adjust the resolution, frame rate and photosensitivity

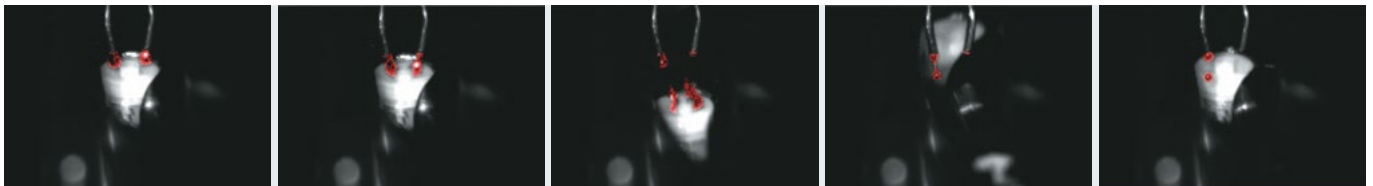
The modern sensors used by the MotionBLITZ® Cube series make it possible to find the right combination of resolution, high frame rates and photosensitivity. For example, the MotionBLITZ® Cube4 can take up to 1,000 images per second at a high resolution of 1,280 x 1,024 pixels.

It thus provides crisp, clear images of very fast processes. Depending on the requirements, with a smaller region of interest, the frame rate can even be increased to 93,000 frames per second. In addition, the sensors are designed to be very sensitive. This means that the high light requirement can be reduced to an easily manageable level. Ambient light alone is often sufficient.

Reliably recording the time of the fault

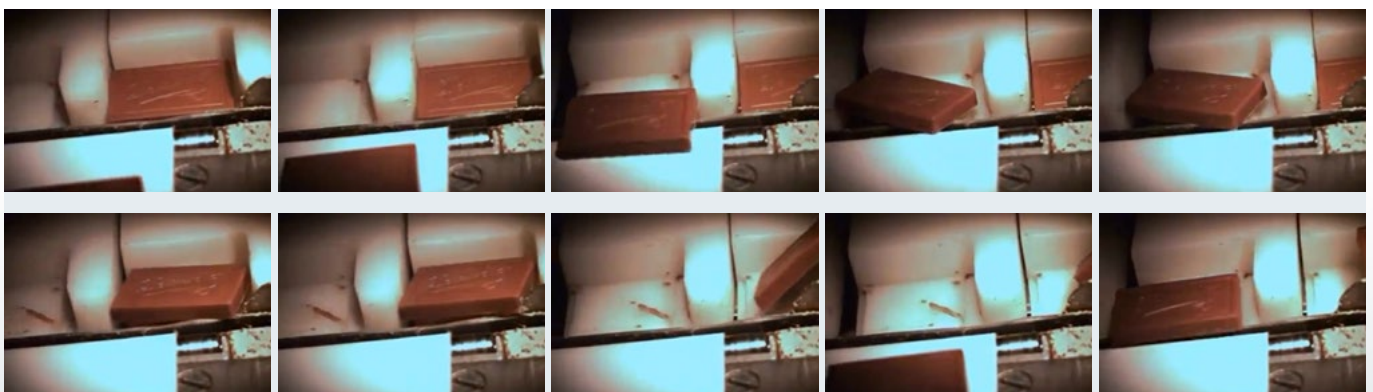
In order to store the processes safely, Mikrotron high-speed cameras use a ring storage device. This memory device is completely filled with shots and constantly overwritten again. Thus, when the error occurs, a signal is sent to the camera and the recording is stopped. The video material recorded up to that point remains on the internal memory and can be read onto a notebook or PC. The signal is triggered by a person watching the process or by a sensor connected to the camera. Alternatively, the additional ImageBLITZ® function stops the recording when it detects a change of brightness in the image. The MotionBLITZ® Cube cameras can still record at full resolution and speed for up to 13 seconds without being connected to a notebook or PC.

SEQUENCE EXAMPLES



Reduction of maintenance costs at Varta Consumer Batteries

A missing electrolyte drop changed the battery characteristics, polluting the production line and increasing the maintenance costs. "Even the first high-speed recordings with our MotionBLITZ® Cube2 allowed us to make huge steps forward," explains Josef Graule, production engineer at Varta Consumer Batteries in Dischingen. "We could choose the filling nozzles so that the filling process did not lead to annoying splashes." The drops are colored red in the pictures.



Improving packaging processes for cookies

One plant operator had this problem: Broken cookies were being packed. A slow-motion study was able to uncover what was not visible to the human eye. Some cookies to be packaged were put on their trays too fast. Furthermore, the recording showed that cookies arrived diagonally. The plant operator filmed freehand. He used the MotionBLITZ® Cube2 with a resolution of 640 x 512 pixels and a frame rate of 505 frames per second. The sequence of images shown consists of 130 recordings made in less than 260 milliseconds.

Watch this [video on the Mikrotron site](#) (Category Industry: Chocolate tray handling)

The correct setting of recording time, resolution and speed can be individually adjusted.

Play video sequences and detect errors

The MotionBLITZ® Cube and the EoSens® mini series will download the recorded images to a computer via an Ethernet port. One laptop nearby is sufficient. You can then use this to browse through the material, crop the relevant process and convert it to a common format.

Alternatively there is a large screen on the back of the EoSens® TS3 series. The videos can be viewed via the touch-screen interface, edited, converted and transferred to an SD card.

This means you can work without a computer “on location.” In addition, EoSens® TS3 cameras can be used without a mains power connection for up to 4 hours. This means they are fast and flexible, requiring little effort.

