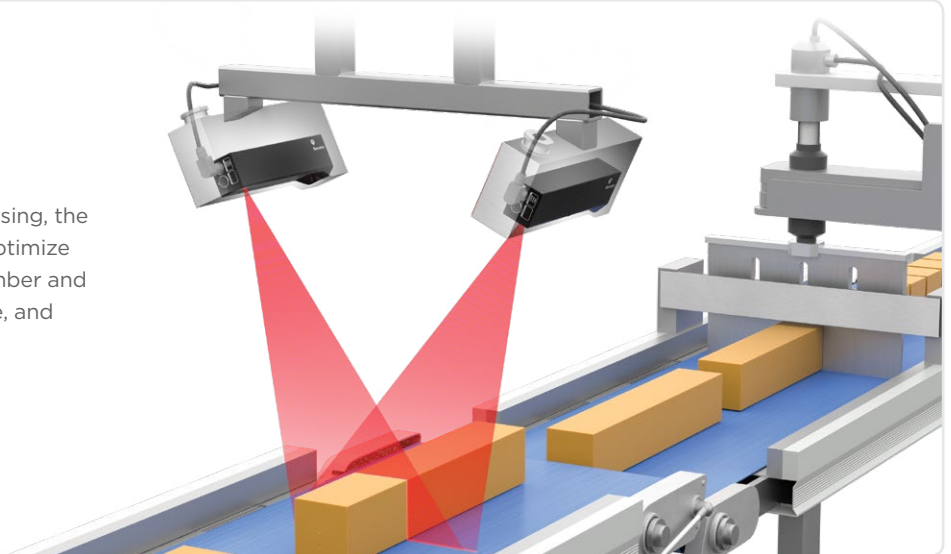


3D SMART SENSORS ENABLE LEAN MANUFACTURING

In industries such as wood and food processing, the major goals of lean manufacturing are to optimize the breakdown of raw materials such as lumber and protein (e.g., meat, cheese), minimize waste, and monitor factory machinery and processes.



Factory optimization includes:

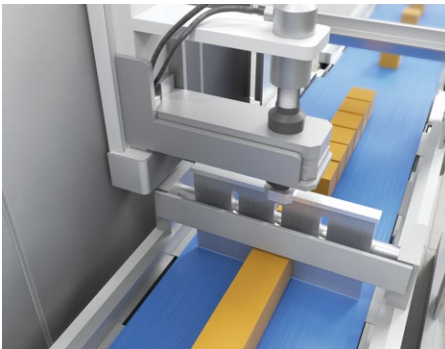
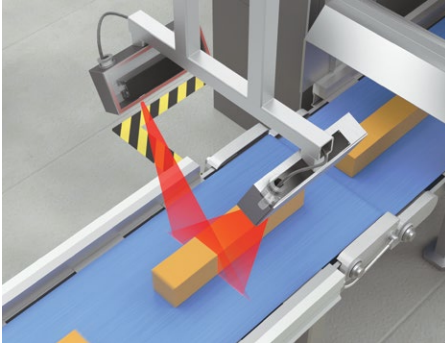
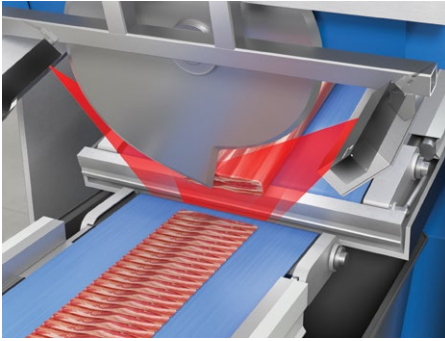
- Automating breakdown of a whole part into multiple smaller parts
- Maximizing material yield and recovery
- Minimizing waste and rework
- Tracking parts to automate sorting and rejecting parts
- Eliminating downtime from failed machinery by error proofing

The Role of 3D Scanning

A 3D smart sensor like Gocator® provides factory machinery with an automated solution for optimizing material breakdown. Specifically, 3D laser scanning drives the optimization process by:

1. Scanning input materials to deliver their 3D unique shape for breakdown optimization algorithms. This leads to less waste and highly efficient machinery.
2. Simplifying 3D scanner integration with support for small footprint, pre-calibrated measurement output, multi-sensor (eg., ring layout) synchronization and stitching, and keeping up to high speed material conveyors.





Tap Into The Speed of Automation

One of the primary advantages of a 3D laser sensor is speed. Traditional techniques—such as manual caliper and micrometer measurements, or touch-probing with a coordinate measuring machine (CMM)—can take hours (or days) to measure complex parts. Even then, these methods typically don't provide sufficient data for optimal breakdown. Such tools can also require specialized skills and resources that might not be readily available to engineers onsite.

A Gocator® 3D smart sensor, however, can be easily set up and used by any member of the production staff. The sensor is pre-calibrated and ready to measure out of the box, delivering thousands of data points in seconds. Not only is measurement data collected at high speed, but data processing, measurement, and control decisions are carried out onboard the sensor—without the need for external PCs or controllers—minimizing latency and speeding up production rates.

Maximizing Yield, Minimizing Material Waste

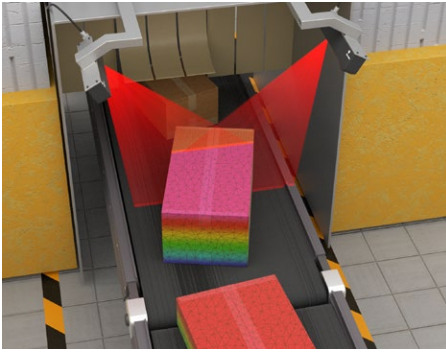
Many raw materials include compound curves and irregular features that can elude traditional measurement tools. By accurately scanning an entire object and generating a 3D point cloud that represents its unique shape, less waste and improved breakdown solutions are possible.

One of the most important advantages of Gocator® 3D smart sensors is the ability to easily create multi-sensor networks in order to capture 360° scans of the target. Multi-sensor metrology systems extend measuring capabilities, so more measurements are possible on a single machine—in turn reducing system cost and complexity.

For example, an angled multi-sensor setup can be used to scan a slab of uncut bacon. This approach eliminates occlusions and captures the complete object shape. The surface geometry of the bacon slab is captured in a single scan, then measured to determine optimal slicing.

Gocator® 3D smart sensors also offer a powerful solution to automate and optimize product packaging at the end of the production lifecycle. Large field of view 3D scan data is necessary to ensure all packaging is correctly filled and sealed before being shipped to the customer.





Tracking Parts for Downstream Control Decisions

Smart 3D sensors provide automated measurement and decision-making for in-line quality control applications.

With high-speed inspection, pass/fail decisions are stamped in time and position for every part. This “decision tag” is stored for every part in smart sensor memory and represents an outcome to be communicated at a later time or position to reject or sorting hardware.

The reject or sorting hardware is at a location downstream from the sensor inspection station, requiring delayed communication between the sensor and the downstream hardware. This delayed communication can be a timer or an encoder comparator that ensures the part is synchronized when it arrives at the reject or sorting gates.

Tracking part position can be done in an external device, but this involves integration cost for added hardware and/or software. A better solution is to use an all-in-one smart 3D sensor with built-in tag and tracking capability.

Tracking provides the ability to delay the output of a part decision until the part arrives at the reject or sorting station. There can be hundreds of parts between the sensor and the downstream station, so a FIFO (first in, first out) memory is required to save decisions and track part positions until they reach the sorting or rejection hardware. The delay can be a specified time or distance of travel. Time delay is used for transport systems with constant speed, and distance delay is used for encoder-equipped transport systems with variable speed.

Machine and Process Monitoring

In addition to the optimization of material breakdown decisions, Gocator® 3D smart sensors can be used to monitor factory machinery (e.g., paddle deflectors, cutting/slicing machines) for key performance indicators such as speed and accuracy.

In the wood industry, Gocator® has proven effective in providing mills with critical machine monitoring capability. Over time, mill machines are subject to wear and tear, which adversely affects performance. By combining 3D scanning, measurement, and control in a single device, Gocator® is able to integrate into a variety of mill machine centers to deliver 3D data for robust error-proofing. Machine monitoring applications include:

1. Monitoring sawing variation, saw kerf, and bandsaw performance.
2. Monitoring lumber sizes at outfeeds of various machines.

Machine monitoring allows the mill to optimize machine performance and maintain the highest level of product quality and throughput over time, while minimizing system maintenance costs.

Proven 3D Technology Advances Lean Initiatives

Although industrial 3D sensor technology is robust, its use in the quality inspection realm is only recently becoming popular. In today’s highly competitive manufacturing environment, it can be a game-changing tool for companies looking to introduce or improve lean manufacturing processes.

You can learn more about 3D smart sensors and material optimization in this [complimentary brochure](#).

