

3D check of chocolate moulds

During production, chocolate moulds are subjected to systematic wear and tear. Strong mechanical and thermal stresses lead through time to the moulds becoming brittle whereby parts can deform and break away. To recognise break-off pieces and monitor automatically the wear and tear to the moulds, a reliable system is necessary. Because the fracture behaviour of the moulds is scarcely predictable, checking processes in which the damage is always sought in the same places are only of a limited suitability.

3D scan makes the difference

Bi-Ber tested several potential solutions with a 3D laser profile sensor ultimately achieving the best results. With it, small unevennesses due to splatter can be very reliably differentiated from broken away pieces of plastic. The method also guarantees a high resolution and good documentation of the detected defect even although the plastic surface of the form strongly scatters

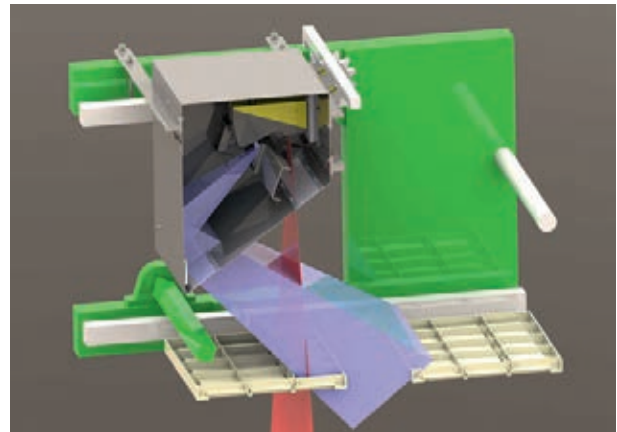


3D image with break-off marked

How it works: triangulation process

The system uses the triangulation process and consists of a sensor box with two DS1300RD 3D cameras from Cognex, a rotary encoder for detecting the conveyor speed, a photoelectric barrier as trigger and a panel PC for evaluation and documentation. Each camera has a recording width of 340 mm and views the mould at an angle of 45°. The cameras observe the deformation of a laser line which beams perpendicular to the object and under which the mould is moving. The deformation is recorded as a profile line. The sequenced profile lines produce a 3D profile that can be checked for chipping or deformations. The high precision 3D system has the following essential characteristics:

- Reliable recognition of break-offs at large scan widths
- Suitable for mould widths of up to 640 mm at mould heights of up to 40 mm
- Narrowest recordable ridge width: 2 mm
- Exposure frequency of up to 10,000 Hz



3D model of the system in cross section

The system recognises break-offs with a definition of 1.6 mm perpendicular to the observation level and 0.5 mm in the observation level respectively. Because as a rule more than one square centimetre of material breaks off, breakages can thus be detected with certainty and precision.

Flexible and plant-specific adaptability

The system has been fitted into the highly optimised production line of a customer directly behind the knock-out mechanism where it is constantly subjected to vibration. In order to ensure precise measurement results despite this, the vision system is isolated from vibration with additional elastomer bearings compensating for the shocks of the knock-out mechanism.

All components are foodstuffs compatible being executed in stainless steel. The system can be adapted to other plants without problem. It can be freely dimensioned and be geometrically adapted individually to the respective plant. Greater scan widths are also possible by sequencing multiple cameras. Other resolution levels can also be implemented individually.



Interior view of the camera housing

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SYSTEM
INTEGRATOR
PSI
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