

PRESS RELEASE

Inline Quality Control for Forming Processes

Detecting Quality Deviations Before Scrap Is Produced

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(Darmstadt) In high-speed stamping and forming processes, it is crucial to detect quality deviations while production is still running. If wear-related changes are only identified afterwards, defective components have already been produced. With its camera-based Inform-QC system, the Fraunhofer Institute for Computer Graphics Research IGD addresses this issue directly within the manufacturing process. The system analyzes the surfaces of formed components inline and detects changes that may indicate tool wear.

Quality Inspection at Production Speed

Inform-QC can, for example, be integrated into an unused station of a progressive die, eliminating the need for an additional external inspection station. The technology is based on photometric stereo: the component is illuminated and captured from different directions. From these images, the system calculates a digital representation of the surface topography and compares it with a reference. This makes it possible to detect subtle deviations and assign them to potential process stages or tool components.

The analysis is carried out continuously at production speeds of up to 400 strokes per minute without slowing down the production cycle. The underlying approach can also be applied to other stamping, deep-drawing and forming processes.

“At high production speeds, downstream quality control may come too late. Our goal is therefore to detect changes where they occur – directly within the forming process. The component surface not only provides information about the quality of the individual part, but can also indicate the condition of the tool,” says Hasan Kutlu, researcher at Fraunhofer IGD.

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Changes to the surface can, for example, indicate abrasion or material deposits on the tool due to adhesion. Detecting such changes at an early stage enables companies to respond more quickly and reduce scrap. At the same time, the data collected provides a basis for condition-based maintenance and, in the future, predictive maintenance.

Further Development for Lubricated Surfaces

Previous research focused on dry metal surfaces. In industrial forming processes, however, metal strips are usually lubricated. The lubricant film changes the optical properties of the surface and therefore creates additional challenges for camera-based analysis.

In a recently launched follow-up project, Fraunhofer IGD is therefore investigating how the method can also be applied to lubricated surfaces. The researchers are examining how the influence of the lubricant film can be taken into account or deliberately utilized during digitization and quality analysis. The aim is to bring the technology even closer to the conditions found in industrial forming processes.

Experience Inline Inspection at EuroBLECH

Fraunhofer IGD will present Inform-QC at EuroBLECH in Hanover. A specially developed demonstrator recreates a continuous manufacturing process on a compact scale: different formed components are fed to the sensor system one after another and digitally captured. Visitors can see firsthand how quality inspection can be integrated into an ongoing production process.

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For more information:

[Inform-QC – Inline Quality Control for Metal Forming - Fraunhofer IGD](#)

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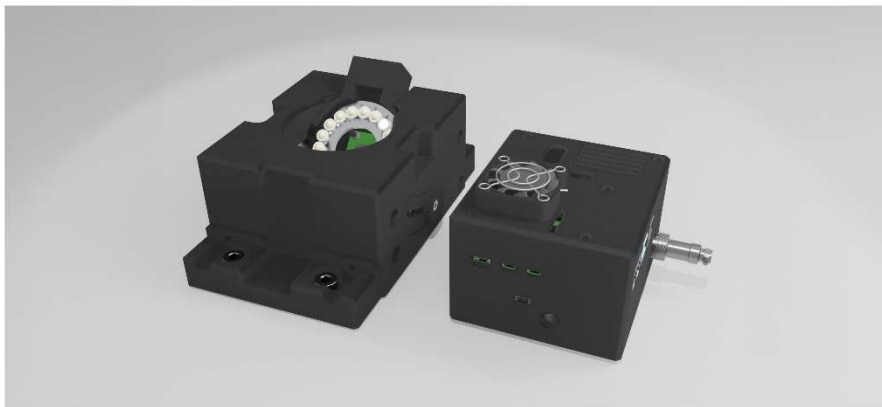
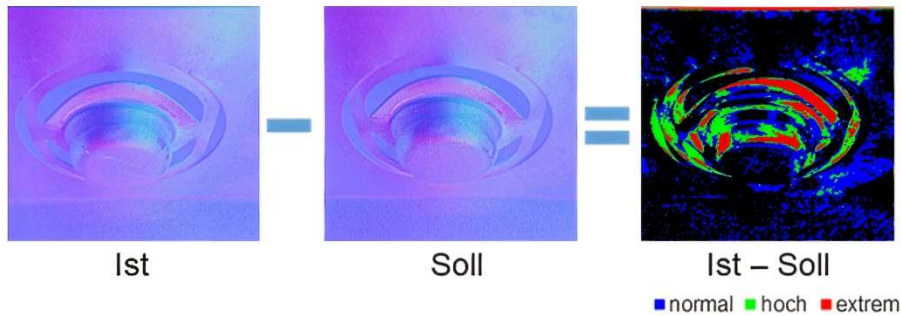


Image (M): The camera-based Inform-QC system compares component surfaces with a reference state, visualizes deviations and can be integrated directly into existing production lines.

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About Fraunhofer IGD

The Fraunhofer Institute for Computer Graphics Research IGD has been setting standards in visual computing – image- and model-based informatics – for more than 30 years. Its roughly 260-strong staff support companies and institutions across manufacturing and mobility, healthcare, bioeconomy, infrastructure and public services, and maritime economy sectors. Fraunhofer IGD provides specific technological solutions and support for strategic development. Its researchers carry out problem analyses, design hardware and software, develop prototypes, and implement interactive visual systems. The focuses are human-machine interactions, virtual and augmented reality, artificial intelligence, interactive simulation, modeling, and 3D printing and scanning. Fraunhofer IGD has been engaged in high-level research since 1987, supporting change in society and the economy with application-oriented solutions developed at its facilities in Darmstadt and Rostock.

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