

QUALITY CONTROL WITH SHEAROGRAPHY AND 3D-DIGITIZING

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Steinbichler Optotechnik GmbH develops and manufactures optical Sensors in the field of Quality Control since more than 20 years. The NDT systems are used in the production and also in the In-Field-Service. Especially for large parts which are used in the aircraft and wind industry need efficient and fast methods. For the check of geometrical dimensions white light fringe projection systems and laser scanner are very useful. Depending on the application one of these technologies will be chosen for optical quality control of the object geometries and comparison between 3D-CAD and measured 3D data.

For the **detection** of surface defects like **small dents and scratches** with a depth of only a view microns also the fringe projection method comes into play. With special designed flash lamps the scanning time can be reduced dramatically and shows new opportunities.

Additionally the full-field method called Shearography is used for NDT. The base is an interferometric method for the contactless inspection of composite materials like carbon fibres.

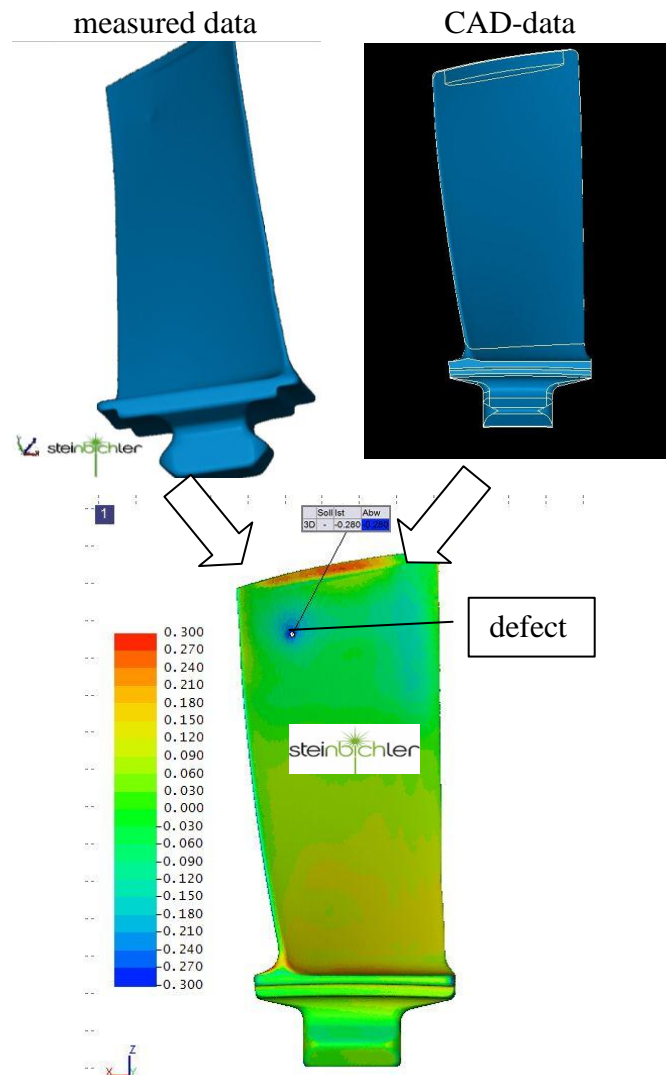
Delaminations, disbondings, cracks in composites can also be detected as **undulations, wrinkles** and core junction defects of core materials. This method does also work on different type of sandwich structures **including foams as core material**.

The object under inspection is stressed by a minor load far below the load in real conditions. The technology makes differences in stiffness clearly visible.

In combination the different and fast optical measurement technologies allow it to control the composite production more efficiently. With the Steinbichler Comet and T-Scan Scanners it is possible to digitize objects. The **3D-Data** from the scans could be used for different applications in design, development and especially in the **quality control**.

For example a **complete** turbine blade can be **digitized in a view seconds**. In a further step the data can be converted in all important 3D-Formats like iges- or stl-Files. With inspection software like INSPECTplus it is possible to measure and to compare these digitizing data to the specifications.

Differences to specified dimensions can be shown easily and the measured values are ready for a further use in different database applications. Additionally it is possible to do a variance analysis between the measured and the CAD data. Therefore both data can be superimposed and discrepancies will be shown by different colours.



comparison between measured and CAD data
created with Steinbichler tools

Moreover defined analysing data and values can be exported and used in database applications. Step by step a measuring strategy will be defined and a following an automated quality control process is possible. Through the full field technology much more data are available in comparison to tactile measuring systems.

White fringe protection in combination with flash lamps used in Steinbichler Automatic Body Inspection System (**ABIS II**) helps to detect surface damages in a very fast inspection time. Dents and scratches will be detected up to a depth of a view microns. The detection of not viewable surface defects in shortest time is followed of an automated classification and reporting. The fastness of the ABIS II system from Steinbichler guarantees a cost-effective surface inspection for high end products and satisfied customers.

Resulting of the increasing cost pressure of the airlines, new aircraft generations have to be lighter with reduced fuel consumption. Driven of new technologies in aerospace engineering a shift away from the paradigm of aluminium aircraft has been forced. New metal alloys and composite materials allow it to produce much more cost-effective and comfortable planes for the customers. Following of the change to new materials the demand on new NDT methods is increasing and necessary.

Most NDT methods currently used in aerospace applications (UT, tap testing, etc.) have limitations in testing sandwich structures and can hardly detect “kissing disbonds” without gaps between the separated plies. Tap testing for huge areas is time consuming and offers no test documentation. Additionally the time for NDT have to be decreased. With Steinbichler Shearography systems (**ISIS**) the test time can be decreased dramatically.



NDT with Steinbichler Shearography on composites

ISISplus – the Steinbichler NDT software allows it with the modular software concept to develop Shearography programs, including the creation of a test plan, the execution of the Shearography tests and the automated documentation. A fully automated process is possible for a fast and cost-effective testing. A varies of stationary and mobile ISIS system gives the customers the possibility to use the Shearography technology in different steps in the life cycle of aircrafts. The Steinbichler **ISIS systems** can be used for quality control in the **production process** and in the **In-Field service** as well.

The Steinbichler **ISIS Shearography** systems are designed for the quick and unambiguous determination of flaws, also in **honeycomb** and **foamed sandwich** structures. No contact medium and no preparation of the object are necessary and make a **fully contactless NDT** possible. Each measurement is automatically documented containing date/time information, as well as 3D coordinates of the field of view and other relevant information defined by the customer. A detailed test report including an overview of the single measurements is generated automatically.

A wide field of different quality tasks can be solved with optical measuring devices. Surface defects can be identified as well as internal inhomogeneities.

You have a demand on optical measurement? Ask us – your Steinbichler team will find a way!