Optical 3D Deformation Analysis

Three-dimensional optical deformation analysis provides local information on surface deformations of components under static or dynamic load. Displacements and strains obtained from such measurements therefore allow an improved insight into material and component behavior.

Whereas static or dynamic testing with a standard testing machine only yields global information on properties of the entire system under consideration, employing a three-dimensional optical deformation analysis device offers spatially resolved information on displacements and strains on the surface. The method allows simultaneous measurements of all visible parts of the surface and therefore renders a cumbersome mounting of several strain gauges unnecessary.

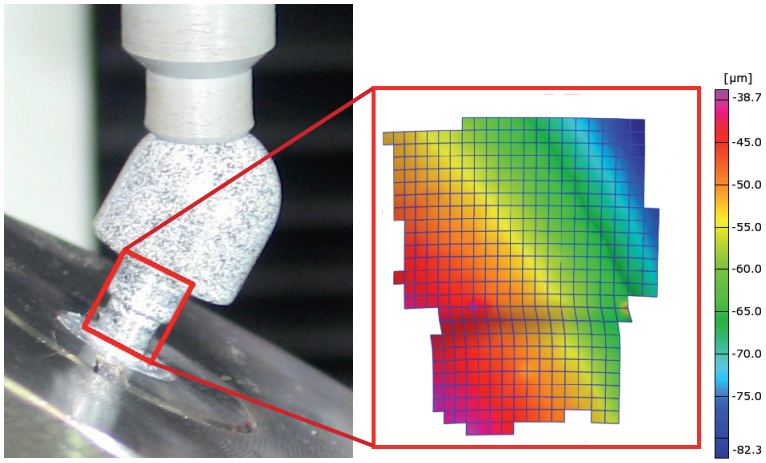

Figure 1: Clamped dental implant (left) and measured vertical displacement in µm (right).

The measurement equipment for optical three-dimensional deformation analysis available at RMS Foundation allows dealing with surface areas ranging from several mm^2 up to approx. 100 cm^2. For illustrative purposes, figure 1 shows the displacement field on a dental implant as an example of a small surface area, while figure 2 depicts the strain field obtained from a three-point bending experiment performed on a larger polyethylene bar.

Validation of Finite Element (FE) calculations and simulations is another domain in which the advantages of optical three-dimensional deformation analysis can be fully exploited. Unlike simplified FE models, this measurement methodology provides you with accurately measured deformations on effective surface structures under real boundary conditions.

Take advantage of this contactless measurement principle in order to gain in-depth insight into the mechanical behavior of your component or material, which opens the way to efficient experiment-driven design and material optimizations.

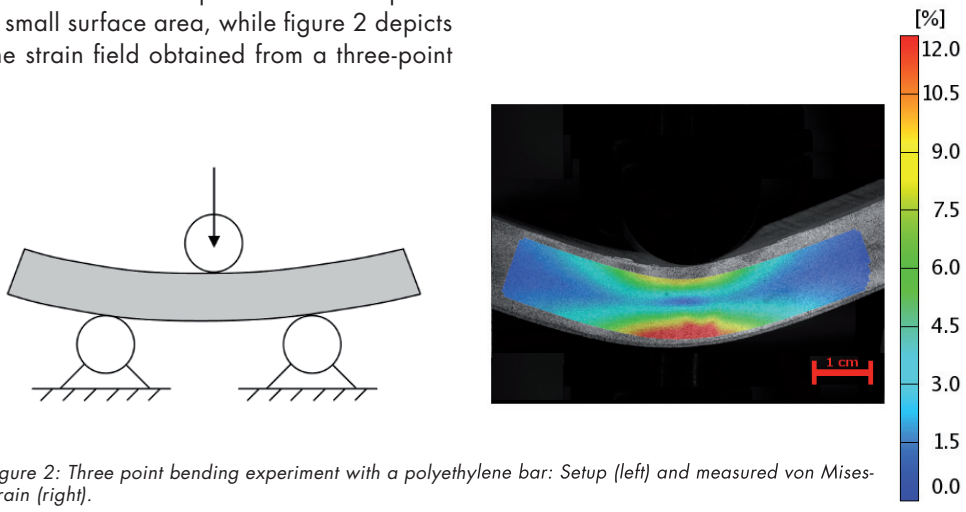

Figure 2: Three point bending experiment with a polyethylene bar: Setup (left) and measured von Mises-strain (right).

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Equipment

- GOM Aramis 2M: Optical three-dimensional deformation analysis device
- Can be used with any testing machine as long as the surfaces to be measured are visible; synchronization via BNC cable possible.
- Mobile system, contact us for potential on-site measurement at your location

Properties

- Deformation analysis of visible surfaces ranging from several mm^2 to approx. 100 cm^2
- Strain measurement range 0.01% – 100%
- Precision down to 1 µm (depending on the size of the measurement range)
- Contactless measurement principle
- Frame rate up to 15 Hz

Please discuss your questions with us! We will be happy to advise you.

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Or ask for our service catalogue. You will find this and other information on our website as well.

The RMS Foundation has been certified according to ISO 9001:2008. Selected services have been accredited according to ISO/IEC 17025.

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