FOCUS ON IMAGING

StrainMaster DIC

Software for acquisition and calculation of full field data from material testing

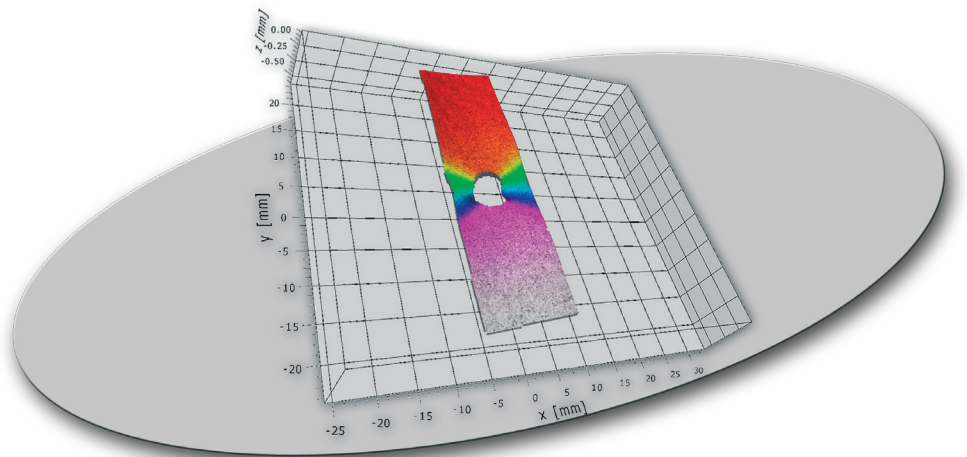LaVision's new **StrainMaster DIC software** is a state of the art platform for the acquisition of full field surface shape, displacement, and strain data. It is easy to use and fully featured, and includes all necessary modules for successful Digital Image Correlation (DIC) based material testing.
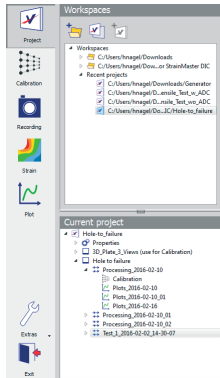
Project manager tree view

Easy to use

▶ calibration - quick and easy using only one view of the special calibration plate
▶ record - acquisition of the test sequence with full hardware control
▶ calculate - surface shape, displacement and strain
▶ plotting - featuring virtual extensometer and gauge modes
▶ export - in a variety of standard and dedicated formats

Thanks to a modern user interface, the program can be operated intuitively after just a few minutes of introduction. All steps in the workflow from recording to result export are easily understood. Once you have established your standard methodologies, these routine tasks can be saved and easily recalled later.

StrainMaster DIC is highly versatile and with it you can study any type of material coupon or component testing, regardless of the loading mechanism (thermal, electrical, mechanical, aerodynamic). The full field map that it yields is like having thousands of miniature gauges on the specimen surface.

left: full-field strain computation
right: free positioned strain gauges & extensometer

Organize and manage

The project manager workspace is the hub of the **StrainMaster DIC software**, and this is where your data is organized for evaluation. The software has the flexibility to allow workspaces to be arranged in a variety of convenient ways:

▶ by user
▶ by specimen or material type
▶ by test type
▶ by creation date

As well as organizing data, in combination with the StrainMaster Controller, **StrainMaster DIC** controls the image acquisition from the fully integrated cameras. The user has total control over the connected devices and is able to choose frame rate, exposure time, and lighting mode.

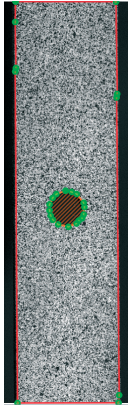*Automask with excluded hole*

Accurate results

Scalar field with vector grid

Gauge plots

In addition to the full field data it gives, which can reveal strain hot spots that mechanical devices do not see, it is possible to use the virtual gauge and extensometers to make comparisons with traditional mechanical sensors, with the benefit that you don't need to know where to place these virtual gauges before the test commences. You are free to define the location, type and number of virtual gauges:

▶ use of any number of optical strain gauges or extensometers at different positions
▶ resposition the gauge after the test
▶ repeated evaluation of the same data set with different parameters
▶ compare with mechanical devices

In some cases you may have a component with a complex shape and you will need to define the area of interest for which you want to calculate the full field data. But with **StrainMaster DIC** there is no need to manually define the geometry of the object because it will be detected using the auto mask feature, greatly improving efficiency.

The accurate DIC algorithms quickly give displacement maps, and from the displacements you are able to choose the type of strain tensor you wish to calculate:

▶ Right Cauchy-Green (engeneering)
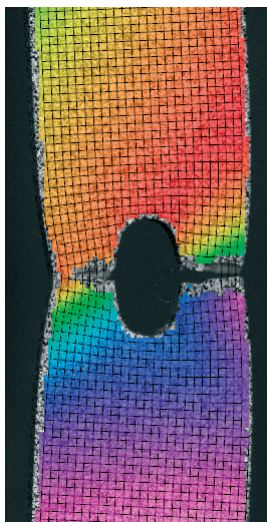▶ Green-Lagrangian
▶ Almansi
▶ Hencky (logaritmic)

To aid interpretation of the data, the maps can be shown using different palettes with a grid or vector displacement arrows, and the raw image of the specimen can be displayed in the background for easy orientation. With stereo data you can also switch to a 3D view, showing the surface shape.

The following quantities can be displayed:

▶ total, x, y or z displacement
▶ surface height
▶ axial strain
▶ transverse strain
▶ shear strain
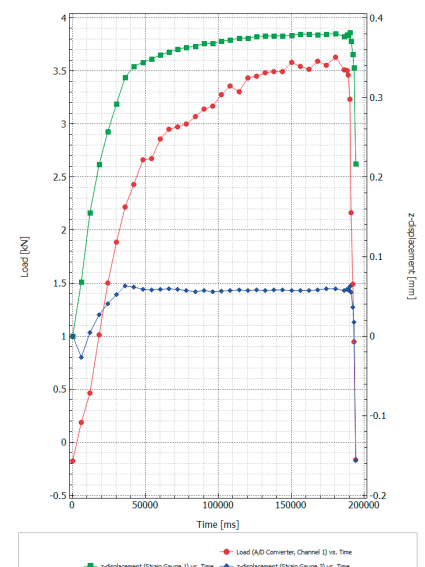▶ principle strains
▶ Poisson ratio

The virtual gauge plot module offers freely configurable axes for reporting of the computed data against image number, time, or the recorded analogue (e.g. load) signal from the test machine, allowing you to show standard test curves. The export function allows you to take your data into popular third party programs such as MS-Excel®, TecPlot®, MATLAB® or ABAQUS®, or to visualize as images or movies.

Please consult with your LaVision representative for options and details.