NDT Services from TWI

Laser Shearography

Description

Laser Shearography uses the coherent, monochromatic properties of laser light to generate speckle patterns.

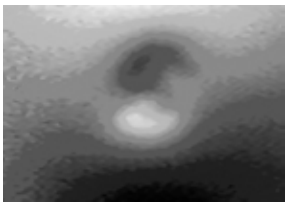
The component to be inspected is illuminated by the laser. The surface reflects the light creating a speckle pattern at the viewing plane, which can be processed to provide information such as the presence of defects, material degradation or residual stress.

The system records the speckle pattern from an unstressed component surface. The image is recorded using a video camera, digitised and stored on a computer. The surface is then stressed and a new speckle pattern generated, recorded and stored.

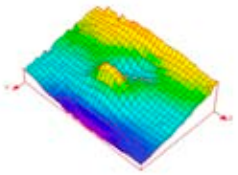
The computer subtracts the speckle patterns from each other, thus forming an image made up of series of characteristic black and white fringes, representing the surface strain in the area of interest. If a defect such as a void or disbond exists, this will affect the surface strain and the defect can be revealed by the fringe pattern developed. This can be processed further by the computer to generate an unwrapped image and a 3D strain map, making the fringe pattern easier to interpret by the user.

TWI owns a Laser Optical Engineering SM 1200 Strain Mapper. This is unique in that it can separately resolve in-plane and out-of-plane strain through the use of a novel dual laser system. This is especially useful when it is necessary to differentiate between faults that produce mainly out-of-plane strain, such as skin to core disbonds, and those that produce mostly in-plane strain, such as cracks.

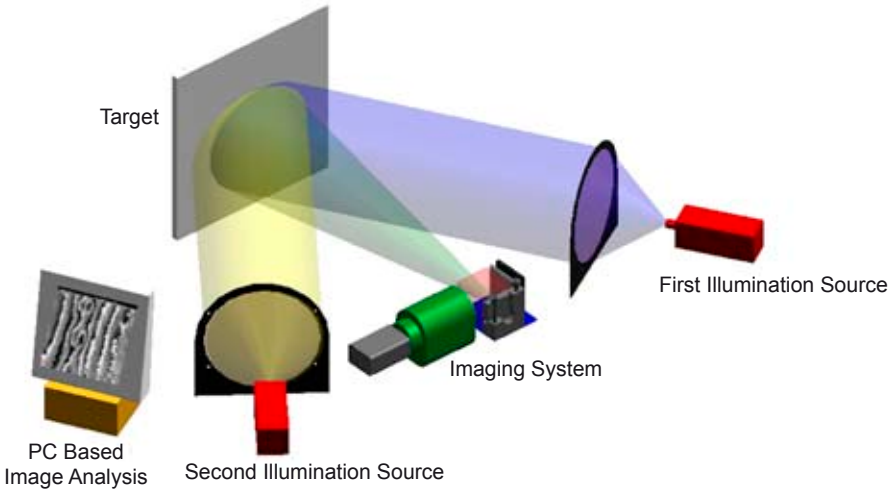
Fringe Pattern



Unwrapped Image



3D Strain Map



Schematic showing the unique dual laser system

Applications

TWI is using its SM 1200 in two major collaborative projects funded by the European Commission.

Sure2grip (www.sure2grip.com) is concerned with the development of an integrated NDT system for inspecting joints in GFRP pipes. The intention is to be able to detect both initial and in-service flaws, such as:

- Build Damage (BD) in the form of weak bonds.
- Accidental damage (AD) in service, in particular Barely Visible Impact Damage (BVID) caused by high velocity impact by solid objects.
- Environmental degradation (ED) caused by ultra-violet exposure or salt water osmosis.

Renewit (www.renewit.eu.com) aims to develop an integrated NDT system to inspect wind turbine blades. Shearography will be used to detect impact damage, in particular defects in the skin-to-foam interface.

Laser Optical Engineering SM 1200 laser shearography equipment

For more information on the services offered in this leaflet, contact:

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