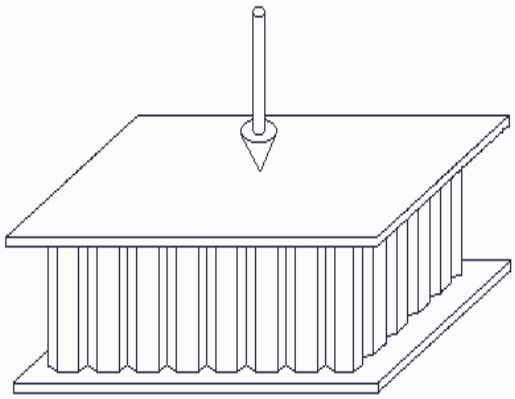
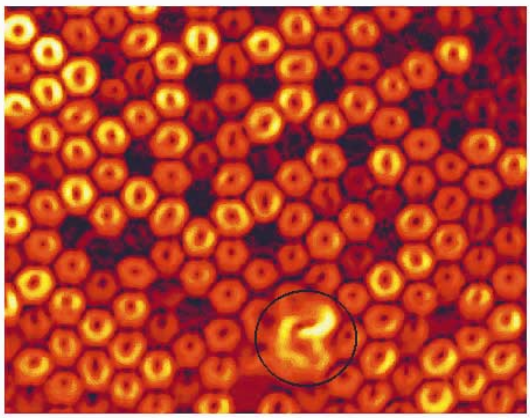
VibroMap 1000

Application note: Non Destructive Testing

Disbond in Polymer Honeycomb Structure

TV-holography was used to detect disbonds between the internal honeycomb structure and the cover material in an antenna for use in space. The polymer

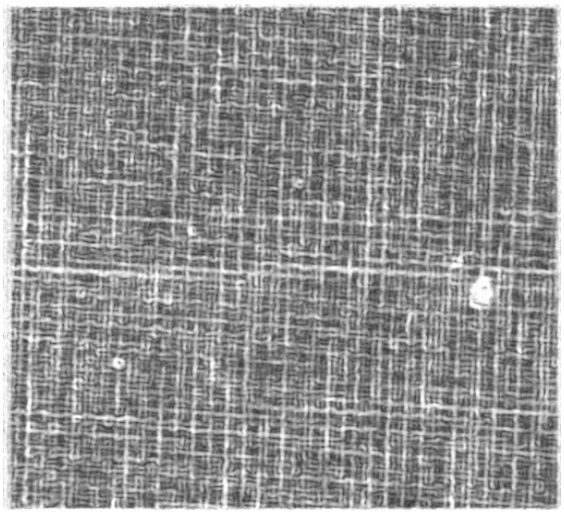




honeycomb structure was gently heated and surface deformations were measured from one side of the plate, as indicated by the arrow in the left figure. By use of a noise reduction routine and by calculating the gradients of the deformation, we can see deformations around individual cells (right figure). In areas where the cell structure is visible, the bonding between the internal structure and the cover plate is good. Dark cells are cells filled with glue. We also see an area without a visible cell structure, clearly indicating a disbond (see dark circle). Disbonds on both sides of the honeycomb plate can be detected by measurements on one side. Imaged area is 5x6 cm, but areas typically up to 30x30 cm or more can be analyzed in a single recording.

Defect in Carbon Fiber Reinforced Material

TV-holography was used to investigate the internal fiber structure and fiber orientation in a CFR panel used in a military aircraft. The material was gently heated with a lamp and surface deformations were measured. The noise reduction routine was used, and the figure shows the deformation gradients. Several crossed fiber layers in different depths in the material are seen in the figure. We can also see a defect area (bright spot) inside the material. Imaged area is 10x10 cm.



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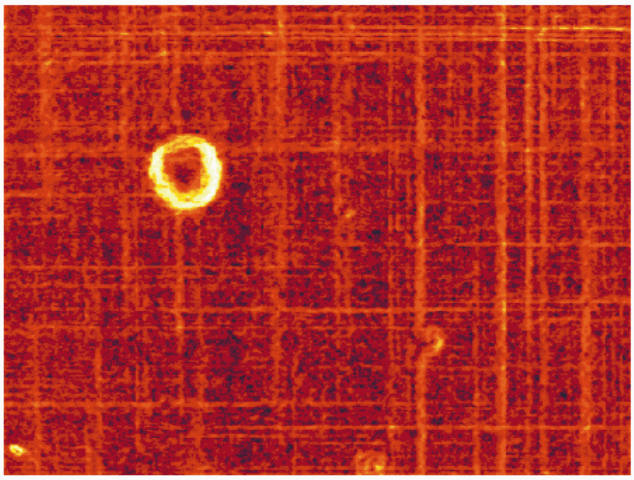
Delamination in a CFR

TV-holography was used to detect a delamination in a CFR panel for a military aircraft. The CFR panel is made by 6 laminated plies. The material was gently heated with a lamp and surface deformations were measured with very high resolution. The figure shows an 15x15 cm area, and a delamination between plies inside the material is detected. We can also see the inside fiber structure in the material.



About Non Destructive Testing with TV-holography and Shearography

With TV-holography and Shearography we measure very small deformations and vibrations on object surfaces. When the object is excited in a proper way, defects inside the material can be detected, as defects influence the surface deformations and vibrations. It is very important to find the right excitation for different applications, as the type of excitation is of vital importance to the result. If your material is suited for TV-holography or Shearography testing, this can be a cheap, high quality and simple alternative to e.g. ultrasonic testing.

Typical applications and excitation methods

Application	Excitation
Disbonds in plasma-sprayed structures	White noise vibration
Delaminations in composite materials	Thermal/vibration/vacuum
Impact damage in polymer composites	Thermal
Fiber structure analysis	Thermal
Cracks in metallic materials	Pulsed heating

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