Ultrasound Excited Thermography - Advances Due To Frequency Modulated Elastic Waves

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Abstract

Ultrasound excited thermography allows for defect selective imaging using thermal waves that are generated by elastic waves. The mechanism involved is local friction or hysteresis which turns a dynamically loaded defect into a heat source which is identified by a thermography system. If the excitation frequency matches to a resonance of the vibrating system, temperature patterns can occur that are caused by standing elastic waves. These undesirable patterns can affect the detection of damage in a negative way. We describe a technique how the defect detectability of ultrasound activated thermography can be improved. With the objective of a preferably diffuse distributed sonic field we applied frequency modulated ultrasound to the material. That way the standing waves can be eliminated or reduced so that the detectability is significantly improved.

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