Institute of Materials Research and Engineering
A*STAR
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Non-destructive testing: Advanced Infrared Thermography

The Challenge

Composites are widely used in aircraft parts and in building components.

Hidden defects in these parts and components may pose a threat to the integrity of structures.

Various conventional non-destructive testing (NDT) techniques such as acoustic emission, eddy current, magnetic particle, radiography and the conventional infrared (IR) thermography, can detect defects in composites, but many of them are time consuming, radiative in nature and require extensive training to interpret results.

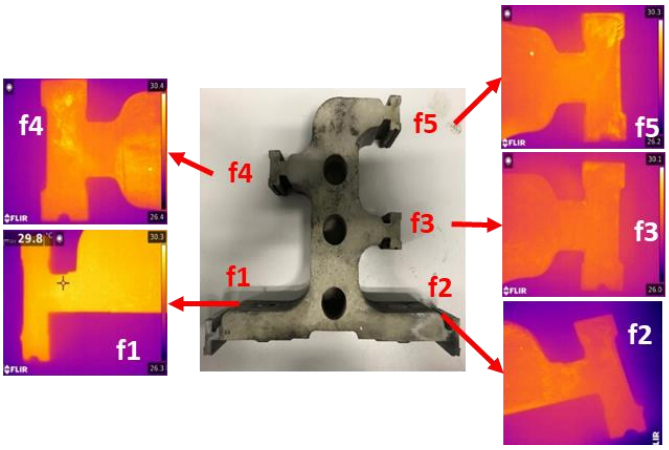
About the Capability

IMRE scientists developed an improved Advanced IR Thermography technique which is non-contact, non-invasive and non-radiative to effectively detect hidden defects.

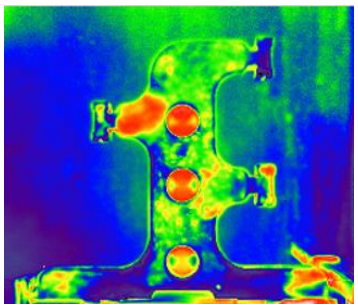
Key Features

- can better detect the sub-surface defects within the composites due to a deeper penetration of 5-6mm compared with 2-3mm using conventional thermography;
- has a lower excitation power of 500W instead of the 1500W of conventional thermography; this poses less danger of damage to specimens like paint;
- is less sensitive to environmental conditions such as non-uniform heating, emissivity variations and reflections;
- poses no health hazard to personnel as the technique is non-radiative.

Technical Data



Conventional IR thermography image of a composite sample



Advanced IR thermography image of a composite sample

Potential Applications

- Detection of hidden defects in aircraft parts, rail components and building claddings.

Collaboration Opportunities

- Further research and development with transportation and construction industries and regulatory authorities.

For more information, please contact:
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IMRE website: https://www.a-star.edu.sg/imre/
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