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DEFECT SIZING BY LOCAL EXCITATION THERMOGRAPHY

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Abstract

In this article, we present a measurement procedure to gain information about depth and angle of open surface cracks. The method is based on a local excitation with, e.g., a laser. The resulting surface temperature is recorded with an infrared camera. Based on this data, crack-caused anisotropies in the lateral heat flow can be detected and exploited to characterise the cracks.

The experimental set-up is based on a Nd:YAG laser. The beam is focused on the test sample by using an optical scanner to generate the required lateral heat flow. The time resolved temperature distribution is recorded with a high-speed infrared camera (InSb FPA, 3 to 5 µm) providing a frame rate of up to 500 Hz.

Up to now, only qualitative information was gained from measurements of this type. Whereas the local transient behaviour of temperature distribution provides also quantitative information of the crack parameters. The general concept of the method presented herein has already been published [1], but the mentioned publication is focused on the crack depth only.

In this paper, we can show that it is possible to simultaneously resolve the angle and depth and, in particular, the depth of non-perpendicular cracks.

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