

## Development of self-reference lock-in thermography and its application to remote nondestructive inspection of fatigue cracks in steel bridges

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### Abstract

A new remote nondestructive evaluation technique, based on thermoelastic temperature measurement by the infrared thermography, was developed for evaluation of fatigue cracks propagated from welded joints in steel bridges. Fatigue cracks were detected from localized thermoelastic temperature change at crack tips due to stress singularity under wheel loading from traffics on the bridge. Self-reference lock-in data processing technique was developed for the improvement of signal-to-noise ratio of the thermal images obtained in the crack detection process. In this paper, experimental results of fatigue crack detection by the self-reference lock-in thermography are reviewed.

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