

Intelligent identification for delamination defects of aviation honeycomb sandwich composites (HSCs) using convolution neural network fusion lock-in thermography

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We demonstrated the convolution neural network fusion lock-in thermography two-dimensional features approach, and this technique can realize the intelligent identification, classification and quantitative characterization for defects of aviation honeycomb sandwich composite (HSCs). Initially, HSCs specimen with delamination defects was detected by halogen lamp-induced lock-in thermography, and the frequency-domain characteristic images were extracted by lock-in algorithm. Furthermore, the image is used as defect feature database after image preprocessing (include contrast enhancement, threshold segmentation, mosaic data enhancement). Convolutional neural network is designed to realize defect identification, classification and size quantization. Finally, based on pixel calibration combining convolutional neural network model with image segmentation and morphological processing, quantitative measurement experiments of defect size and area of HSCs were carried out, and the range and measurement error of quantitative measurement of defect size and area of HSCs were investigated, and the relationship between measurement error and locking frequency was analyzed to realize quantitative measurement of defect size and area of HSCs.

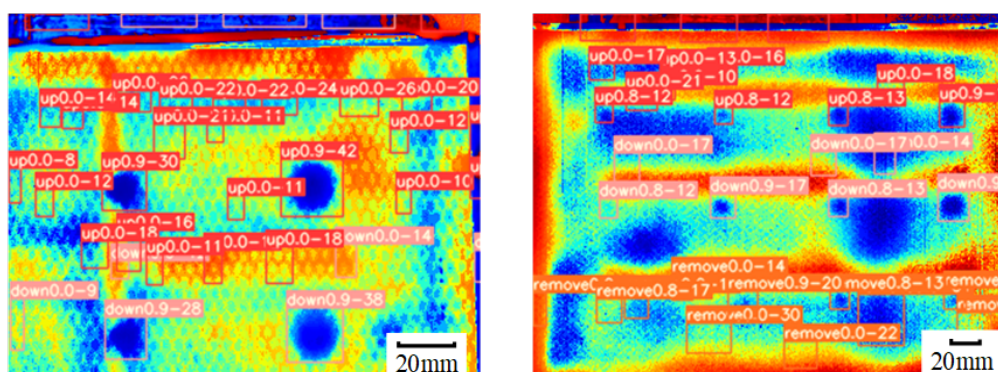


Fig. 1. Defect identification results

References

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