Passive Electric Potential CT Method for Crack Identification

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Abstract

The present authors proposed the passive electric potential CT (computed tomography) method for the identification of defects and cracks in a structural member subjected to mechanical load. In this method piezoelectric film is pasted on a body to be inspected and the electric potential distribution on the piezoelectric film is obtained without applying electric current. The electric potential distribution obtained passively is used for the identification cracks and defects. In this study the method is applied to the identification of plural cracks and defects. An inverse analysis scheme based on the least residual method is applied, in which square sum of residuals is evaluated between the measured electric potential distributions and those computed by using the finite element method. Akaike information criterion (AIC) was used to estimate the number of cracks. The location and size of these cracks are quantitatively estimated by the present method.