



THERMOELASTIC AND PHOTOELASTIC FULL-FIELD STRESS MEASUREMENT

DEONNA WOOLARD

College of William & Mary, Department of Physics, 1999
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Advisor: Mark Hinders, Associate Professor of Applied Science

Abstract

Thermoelastic and photoelastic stress analysis systems effectively provide information about the sum and difference of the principal stresses, respectively. Combining these two full-field, non-contact NDE techniques allows the individual stress components to be measured. One of the main difficulties in merging these two systems is in identifying an appropriate surface coating. Thermoelasticity demands a highly emissive surface, while photoelasticity requires a strain-induced birefringent, transparent coating with a retro-reflective backing. A number of candidate coatings that are useful for combined photoelastic and thermoelastic stress measurement have been identified, with sample results given here. Issues associated with the practical implementation of combined thermoelastic and photoelastic stress measurement are also discussed in this dissertation.