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An Optical Strain Rosette/Ring-Core Method Applied on Laser Weld

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Residual stresses are induced in manufacturing processes and exist in many industrial parts. For the measurement on small areas with high stress gradients,the resistance strain rosette/hole-drilling method is no longer suitable to be used. As an ideal alternative, an optical rosette-interferometric strain/slope rosette (ISSR) has short gage length (on the order of 100 micrometers) and noncontacting nature. It can measure displacements, strains and slopes by tracing the shifts of interferometric patterns. The miniature ISSR is suitable to be used in the measurement on very small areas with high stress gradients. Ring-core cutting more fully relieves the residual stresses and has higher sensitivity than hole-drilling. The newly developed ISSR/ring-core cutting method is discussed in this paper. Basic principles are introduced and an application performed on a laser weld demonstrates its advantages over the conventional methods.

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