

Characterization of temperature and strain fields during cyclic laser shocks

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Abstract

Thermal shocks are applied to a 304L austenitic stainless steel plate with a pulsed laser. A stroboscopic reconstruction is used for IR and visible camera measurements. The displacement fields are measured with regularized Finite Element-Digital Image Correlation (FE-DIC). Different approaches are used to measure the temperature variations (i.e., IR camera and large-band pyrometry). Several ways of determining the emissivity or absorptivity are discussed. The thermal loading is determined by comparing experimental and Finite Element (FE) analyses. An elastoplastic model is then used to compute mechanical fields that are compared with DIC measurements.

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