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ABSTRACT

Laser induced bending of steel sheet is carried out and thermal stress developed in the heated region is examined. Temperature and stress fields are predicted using finite element model. The microstructural changes in the melted region are investigated through scanning electron microscope, energy dispersive spectroscopy, x-ray diffraction. The residual stress developed at the surface vicinity of the laser treated region is measured using the x-ray diffraction technique, which is, then, compared with its counterpart predicted from the simulations. It is found that the residual stress at the surface vicinity is compressive and the prediction of the residual stress agrees well with that obtained from the x-ray diffraction technique. In addition, surface temperature predictions are in good agreement with the thermocouple data. The laser treated region is free from major cracks and large cavities.

Keywords: laser, bending, thermal stress, temperature