

عنوان مقاله:

Investigation of laser, wire-cut and plasma cutting methods on the residual stress distribution of st37 sheet using the contour method

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خلاصه مقاله:

Cutting is one of the most important manufacturing processes in various industries. After the cutting process, residual stresses are created in the parts. So, calculation and prediction of residual stresses is important and ignoring them if combined with applied stresses can cause failure in parts. In this study, the effects of laser, plasma and wire-cut processes were investigated on the residual stress of st37 sheet using the contour method. For this purpose, an experiment with 8 operational steps including 3 sets of st37 sheets with thickness of 4, 6 and 8 mm in the dimensions of 100 × 100 mm are prepared and after the stress relief operation, they are cut by the mentioned cutting methods. After cutting processes and recording the temperature with a laser thermometer, the test specimens were prepared for contour method. According to the results, the highest residual stress is due to laser cutting in the sample with a thickness of 4 mm and its value is 142 MPa. The lowest residual stress obtained in wire-cut cutting and its value was 28 MPa. As the thickness increased, the amount of residual stress decreased in all methods. The slope of the temperature changes of the part from the moment of cutting to the ambient temperature is higher in laser cutting and the residual stress in this method is higher than the plasma and wire cut method.

کلمات کلیدی:

Residual Stress, Laser, Plasma, Wire-cut, Contour method

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