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MATHEMATICAL MODEL FOR KERF WIDTH DETERMINATION DURING PULSED ND: YAG LASER CUTTING OF SHEET METAL

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Abstract

The cut characteristics obtained during pulsed laser cutting are controlled by large numbers of parameters, however the kerf width formed during pulsed Nd:YAG laser cutting depends to large extent on the amount of energy imbibed on the work piece and on the interaction time between pulse and the work piece. Also it gets affected by the way in which the energy gets dumped into the work piece. In the present paper attempts are made to determine the kerf width obtained during pulsed Nd :YAG laser cutting. The developed model incorporates the effect of thermal properties of material, work piece thickness and laser process parameters (pulse width, pulse repetition rate and cutting speed). The model is validated through experimentation using mild steel and stainless steel work pieces. The experimental results obtained show good agreement with model predictions.

Key words: pulse width, pulse repetition rate, speed, interaction time, top kerf width