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## Optimization of nanostructured FeCrNb hardfacing alloy on stainless steel deposited by PTA process

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Weld deposition is commonly used to enhance the tribological properties of manufacturing components, for which the Plasma Transferred Arc (PTA) technique is increasingly demanded worldwide for enhancement of corrosion, heat and wear resistance. This demand has led to the need to optimize welding processes to reach appropriate weld bead properties. Therefore, in this research PTA process with a Fe-Cr-Nb nanostructured alloy was used with a robotic arm to achieve the optimum welding parameters, in a thin substrate that is highly demanded by the automotive industry. The aim of this study was to develop a mathematical model to predict the weld geometry: penetration, reinforcement and weld width by development of a Design of Experiment (DOE) of twenty-four samples (one block) with a central composite design varying the most important process parameters (current, travel speed, powder feeding rate and plasma gas pressure). Finally, a validation of the best weld bead was performed to corroborate the model results. This research will improve welding operations with a highly industrial potential application by remarking the correct parameters for 409 stainless steel.

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