

Optimization of cold-sprayed Nickel Alloy 625 thick deposits by cold spray using the KSS Software

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Abstract

Cummins R&D Center has been exploring and developing Thermal Spray Processes to repair damaged zones and remanufacture parts while ensuring full confidence on the final performance. For this purpose, Nickel Alloy 625 was selected for the High Pressure Cold Spray High Pressure (HPCS) process as an attractive option due compatibility with cast iron materials and having strengthened alloyed matrix by elements such as molybdenum. By other hand, R&D Cummins Center has been exploring and developing Thermal Spray Process to repair damaged zones and remanufacture parts having fully confidence on the final performance. Therefore, one of the main developments to be optimized is Cold Spray. The present document paper shows reports on the steps developed for a HPCS Cold Spray High Pressure (CSHP) application using where Nickel Alloy 625 is sprayed over a gray cast iron flat substrate. Nickel Alloy 625 powder was cold sprayed under design, in a series of experiments considering only the pressure gas and spray temperature as key variables to determine the influence on the quality of thick deposits. The coatings developed was were tested using the bond strength as according to ASTM C-633 and deposit efficiency was measured during through metallography analysis. RThe experimental results concluded indicateddemonstrate that Nickel Alloy 625 can be successfully deposited on gray cast iron by cold spraying. a positive correlation between good agreement with the simulations done and results presented in terms of deposit efficiency.

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