

Failure Analysis of Electrode, Nozzle Plate, and Powder Injector during Air Plasma Spray Coating

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Abstract : The aim of the research is to develop an optimum microstructure of steel coatings on aluminum surfaces for application on the crankcase cylinder bores. For the proper design of the microstructure of the coat, it is important to control the plasma gun unit properly. The maximum operating time was determined while the plasma gun could optimally work before its destruction. Objectives: The aim of the research is to determine the optimal operating time of the plasma gun between renovations (the renovation shall involve the replacement of the test components of the plasma gun: electrode, nozzle plate, powder injector. Methodology: Plasma jet and particle flux analysis with PFI (PFI is a diagnostic tool for all kinds of thermal spraying processes), CT reconstruction and analysis on the new and the used plasma guns, failure analysis of electrodes, nozzle plates, and powder injectors, microscopic examination of the microstructure of the coating. Contributions: As the result of the failure analysis detailed above, the use of the plasma gun was maximized at 100 operating hours in order to get optimal microstructure for the coat.

Keywords : APS, air plasma spray, failure analysis, electrode, nozzle plate, powder injector

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