THERMAL SHOCK ANALYSIS USING THE FINITE ELEMENT METHOD FOR A GIVEN SPECIMEN

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Abstract: *To perform a thermal transitional analysis it was necessary to use ANSYS 14.0, commercial programed for modeling with finite element. For this analysis it was used an OLC 45 sample. Using a plasma jet spraying process one of the samples sides was metal-faced. This analysis follows the idea of temperature distribution alloy with the other characteristics that defines the thermal state in object: the heat quantities released or absorbed thermal gradient, thermal flow. This analysis is followed by a stress analysis to determine the causes of the thermal expansion or contractions. For this process it was used* Zr_3O_2 *material stabilized with* Y_2O_3.

Keywords: *reconditioning, Plasma spraying,*

1. Introduction

The objective of reconditioning is to transform the used parts into new ones, that are able to fulfill the same functional role or another one.

Always, laid down material, used for reconditioning, needs to have better mechanical characteristics and the reconditioned part will be up to two or three times more resistant to fatigue. The reconditioned parts, obtained through loading of material, are made by two distinct components, in terms of chemical composition, thermo physical properties and the behavior to mechanical and thermal stress. These components are the main material and the sprayed layer, which ordinarily has a totally different expansion and contraction coefficients toward from the main material, there is the risk of developing internal stresses that can compromise the entire structure. [1]

Plasma spraying, a thermal spray process in which a no transferred arc is a source of heat that ionizes a gas which melts the coating material and propels it to the work piece (figure 1). Plasma is an ionized gaseous cloud composed of free electrons, positive ions, neutral atoms and molecules. Because of its unique properties some have referred to it as the "fourth state of matter". Plasma is generated whenever sufficient energy is imparted to a gas to cause some of it to ionize. [2]

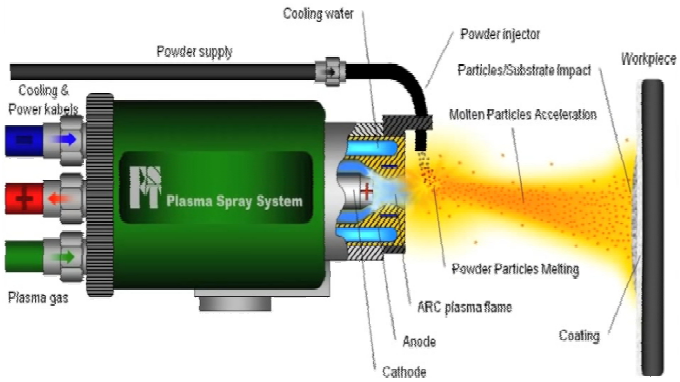

Figure 1 *Plasma Spray Process*