HVOF Coating Delamination from Substrate Surface

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Abstract---Statistically, it is learnt that the number of hydro power plants with hydro-abrasive erosion is found to increase across the hydropower plants in the country. Hydro-abrasive erosion is discovered to be caused due to the suspended particles in the water that passes through the turbine. These particles, which are harder than the surface material of the turbine parts are empirically found to damage the surface depending on the velocity and magnitude of the impact conditions. Ensuing this, the surface material is worn away resulting in geometrical transformation impacting and causing efficiency loss, cavitation and mechanical problems, with consequential higher maintenance costs, less availability and loss in energy production amongst others. A synthesized approach is imperative to bring about impact minimization of this phenomenon.

Today the high velocity oxy-fuel (HVOF) thermal spray process is widely accepted and adopted by many industries around owing to the flexibility and the cost effectiveness of the process. Although there exist a myriad of flame spraying processes, the HVOF thermal spray process utilizes only powder as the coating material. The paramount aspect to reduce the erosion and prolong the operation time of the components is found to coat all relevant parts of the component.

It has been discovered that the delamination of hard coating has been construed as the singular and a major factor affecting the hard coated runners by BHSL in its history of the business operation of BHSL. In the course of its 3rd year of operation, BHSL has witnessed such glitches of its hard coated runners in Tala and Chukha Pelton Runner. Based on the inspection report to this effect, this paper intends to focus on the factors influencing parameters on delamination of hard coating from substrate surface. The scope also include how BHSL has successfully anchored the delamination glitches by way of adopting the change in operating parameters and coating process.

The primary aspect of this scope of this study is identified to bring about the reduction of the fast delamination of hard coating and increase the operation time of the components.

Keywords:- HVOF, thermal spray, delamination, coat, oxidation