Investigations on Corrosion Behaviour of WC–CrC–Ni Coatings Deposited by HVOF Thermal Spraying Process

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The paper presents investigations performed on WC–CrC–Ni coatings, deposited by High Velocity Oxygen Fuel (HVOF) thermal spraying, in order to assess the corrosion behaviour of coatings obtained using WOKA 7504 powder. Mechanical tests, structural and electrochemical analyses have been performed in order to determine the degree in which material composition, powder production method and technological parameters of HVOF process affect the corrosion resistance of the deposited layers. For the corrosion resistance, assessment electrochemical methods were used. Samples immersed in 3% NaCl solution and open-circuit potential (OCP) method were used to examine the potential change and creation of a protective layer on the surface. The best results, in terms of corrosion resistance and adherence resistance of the coating layer, were obtained for layer thickness of 110 to 220 μm. It was found that surface processing, after layer deposition through HVOF process, increases the corrosion rate about 1.5 times compared to unpolished ones, as a result of the protective passivated film removal that forms on the coating layer surface or due to the possibility of additional defects inducing in the deposited layer during the surface finishing operation.

Keywords: corrosion, electrochemical test, coatings, HVOF thermal spray, WC–CrC–Ni

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