Abstract

This research was conducted following the process of coating thermal spray flame technology through the use of a mixture gas composed of oxygen and acetylene for the purpose of obtaining a surface layer of ceramic coating on the surface of the medium carbon steel type (AISI 1050), which provide an increase in wear resistance.

Research carried out in three successive stages, the first stage included the preparation of the surface models and the creation of the basis of these models as well as the preparation of powder coating and analysis of chemical components of the models and powder coating.

While the second stage included the implementation of the bonded coating process (nickel - aluminum) and coating the main (alumina) using a flame spray coating process was conducted in different ways for each model from the change in spraying various factors, which included the surface roughness of the base models, the temperature of the surface of the base models before the coating process, the distance between the spray gun nozzle and the surface of the form and thickness of the coating.

The third stage of research included the testing of adhesion check and check wear and roughness of different coatings in addition to a microscopic examination of the successive layers of coat and surface basis.

Has been reached on the best variables that give the highest adhesion and the lowest wear rate.

Where the results showed that the increase of roughness (0.85 μm) to (10.50 μm) led to the low rate of wear by up to about more than (51%) almost half, as well as increase adhesion coating surface mainly through increasing the mechanical strength of the connections between them by more than (67%). The best temperature of the heated surface of the foundation before the coating process to obtain the lowest rate of wear and higher adhesion ranging from (200 ºC) to (300 ºC), while the optimal distance between the spray nozzle and the surface of the base ranging from (150) mm to (200) mm and thickness optimized for coating ranging from (0.15) mm to (0.5) mm for the best coating with the lowest wear rate and the highest adhesion.

Results showed that the roughness of the surface layer of coat growing up all the surface roughness of the base and a space spray, while the low roughness of the surface layer of coat to increase the surface temperature of the substrate before the coating process and the thickness of the coating.