

Accepted Manuscript

Weibull analysis of hardness distribution in detonation sprayed nano-structured WC-12Co coatings

P. Suresh Babu, D. Srinivasa Rao, L. Rama Krishna, G. Sundararajan



PII: S0257-8972(17)30365-1
DOI: doi: [10.1016/j.surfcoat.2017.04.028](https://doi.org/10.1016/j.surfcoat.2017.04.028)
Reference: SCT 22271
To appear in: *Surface & Coatings Technology*
Received date: 15 November 2016
Revised date: 28 March 2017
Accepted date: 10 April 2017

Please cite this article as: P. Suresh Babu, D. Srinivasa Rao, L. Rama Krishna, G. Sundararajan , Weibull analysis of hardness distribution in detonation sprayed nano-structured WC-12Co coatings. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Sct(2017), doi: [10.1016/j.surfcoat.2017.04.028](https://doi.org/10.1016/j.surfcoat.2017.04.028)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Weibull analysis of hardness distribution in detonation sprayed nano-structured WC-12Co coatings

P Suresh Babu^{a*}, D Srinivasa Rao^a, L Rama Krishna^a, G Sundararajan^{a,b}

^a International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), Balapur (P.O.), Hyderabad-500 005, India

^b Department of Metallurgical and Materials Engineering, Indian Institute of Technology (IITM) Chennai-600036, India

WC based cermet coatings were deposited by detonation spray coating (DSC) technique using nano WC-12Co feedstock at various oxygen to acetylene (oxy-fuel: OF) ratios on mild steel (MS) substrate. Microstructure and phase composition of feedstock and coatings were analyzed using scanning electron microscope (SEM) and x-ray diffraction (XRD) techniques. Microhardness of coatings was evaluated and analyzed statistically as a function of applied load (100 g and 300 g), while a total of 300 indentations performed at each load. Three body rubber wheel abrasive wear tests using SiC as an abrasive medium were carried out and the coating wear rates were calculated. The extent of decarburization in nano WC-12Co coatings increased with increase in OF ratio. The characteristic hardness (H_o) and Weibull modulus (m) were found to be influenced by the indentation load and coating microstructure. An increase in ' m ' value and decrease in ' H_o ' value were noticed with increasing indentation load. Coatings with similar characteristic hardness values have exhibited different Weibull modulus values. Based on the results obtained, the minimum number of indents required for arriving at the characteristic hardness value is calculated, the structure-property correlations were examined and the strategies based on Weibull parameters to achieve best possible properties and performance was proposed.

Keywords: Microhardness, nano WC-12Co, Weibull Modulus, Thermal spray, Detonation spray

Corresponding author: Dr. P Suresh Babu, Research Scientist, ARCI;

Email: pitchuka@arci.res.in, Tel: +91-40-24452412, Fax: +91-40-24442699

Download English Version:

<https://daneshyari.com/en/article/5465407>

Download Persian Version:

<https://daneshyari.com/article/5465407>

[Daneshyari.com](https://daneshyari.com)