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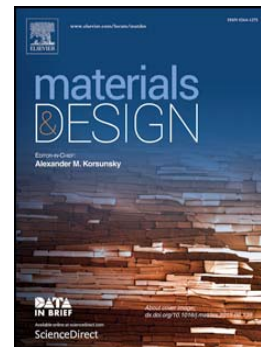
PII: S0264-1275(16)30101-0  
DOI: doi: [10.1016/j.matdes.2016.01.101](https://doi.org/10.1016/j.matdes.2016.01.101)  
Reference: JMADE 1302

To appear in:

Received date: 12 July 2015  
Revised date: 19 January 2016  
Accepted date: 21 January 2016

Please cite this article as: Chengxi Wang, Chuanhai Jiang, Fei Cai, Yuantao Zhao, Kaiyuan Zhu, Ze Chai, Effect of shot peening on the residual stresses and microstructure of tungsten cemented carbide, (2016), doi: [10.1016/j.matdes.2016.01.101](https://doi.org/10.1016/j.matdes.2016.01.101)

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# Effect of shot peening on the residual stresses and microstructure of tungsten cemented carbide

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## Abstract

Shot peening is conducted on pretreated WC-10 wt.% Co composite. X-ray stress analyzer coupled with X-ray diffraction line profiles analysis is employed to determine residual stresses and microstructure of peened samples. Variations of morphology due to different treatments are detected by scanning electron microscope. The results show that the compressive residual stresses in WC and Co phase increase by 48% and 70% respectively after SP. The surface topography and dislocation densities are improved substantially, while the domain size decreases dramatically. Compared with the unaffected region, it is observed that the microstrain becomes severe in the affected region, and the microhardness improves greatly and reaches its maximum in a nanocrystalline layer formed at the top surface of the specimen, representing it is not subjected to the inverse Hall-Petch effect. It is also noted that Hertzian effect induces a higher shear stress in the subsurface, which results in the inflection points revealed on the distribution of residual stresses and microstructure.

**Keywords:** Shot peening, Tungsten cemented carbide, Residual stress, Microstructure.

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