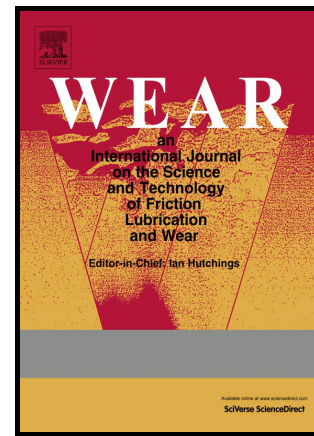


## Author's Accepted Manuscript

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PII: S0043-1648(16)30395-7  
DOI: <http://dx.doi.org/10.1016/j.wear.2016.09.029>  
Reference: WEA101791

To appear in: *Wear*

Received date: 20 June 2016  
Revised date: 27 September 2016  
Accepted date: 29 September 2016

Cite this article as: Jiawang Zhang, Wei Li, Huaqiang Wang, Qingpeng Song, Liantao Lu, Wenjian Wang and Zhongwei Liu, A comparison of the effects of traditional shot peening and micro-shot peening on the scuffing resistance of carburized and quenched gear steel, *Wear* <http://dx.doi.org/10.1016/j.wear.2016.09.029>

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# A comparison of the effects of traditional shot peening and micro-shot peening on the scuffing resistance of carburized and quenched gear steel

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## Abstract:

Carburized and quenched specimens of 17CrNiMo6 gear steel were given two different shot peening treatments. Post-treatment Vickers hardness, residual stress, roughness and topography were determined. Traditional shot peening can increase surface hardness, residual stress and roughness. By contrast, micro-shot peening can decrease of surface roughness and increase both the surface hardness and residual stress even more. Scuffing tests were carried out using a ring-in-V-notch test configuration. It was found that shot peening can improve the scuffing resistance properties of gear steel, and that a combination of traditional shot peening and micro-shot peening can improve the scuffing resistance of carburized and quenched gear steel to the largest degree. The hardness and residual compress stress, roughness and topography produced during shot peening have an effect on the scuffing resistance of the carburized and quenched gear steel.

*Keywords:* Gear steel, Scuffing, Surface roughness, Residual stress, Micro-shot peening

## 1. Introduction

Gear transmission is one of the most important forms of mechanical transmission and it is widely used in machinery, such as the railway vehicle. With the increase of service load, gears fail inevitably during service [1, 2]. Among them, scuffing failure is one of the main failure forms[2]. Different from pitting and spalling which are related to time, gear scuffing will happen as long as the short time overloading or

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