

## Accepted Manuscript

Title: The evolution of microstructure and micro-mechanical properties in the repeatedly renovated QHZ punch in fine-blanking

Authors: Liyun Zhang, Zhichao Chen, Wei Wu, Jingwen Yi, Hanlin Peng, Xianglin Zhang, Jie Chen, Nisha Wang



PII: S0924-0136(17)30554-X  
DOI: <https://doi.org/10.1016/j.jmatprotec.2017.11.034>  
Reference: PROTEC 15508

To appear in: *Journal of Materials Processing Technology*

Received date: 9-5-2017  
Revised date: 16-11-2017  
Accepted date: 18-11-2017

Please cite this article as: Zhang, Liyun, Chen, Zhichao, Wu, Wei, Yi, Jingwen, Peng, Hanlin, Zhang, Xianglin, Chen, Jie, Wang, Nisha, The evolution of microstructure and micro-mechanical properties in the repeatedly renovated QHZ punch in fine-blanking. *Journal of Materials Processing Technology* <https://doi.org/10.1016/j.jmatprotec.2017.11.034>

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.

The evolution of microstructure and micro-mechanical properties in the  
repeatedly renovated QHZ punch in fine-blanking

Liyun Zhang<sup>a</sup>, Zhichao Chen<sup>a</sup>, Wei Wu<sup>a</sup>, Jingwen Yi<sup>a</sup>, Hanlin Peng<sup>a</sup>, Xianglin Zhang<sup>a,\*</sup>,  
Jie Chen<sup>b</sup>, Nisha Wang<sup>b</sup>.

<sup>a</sup> State Key Laboratory of Materials Processing and Die & Mould Technology, College  
of Materials Science and Engineering, Huazhong University of Science and  
Technology, Wuhan 430074, China.

<sup>b</sup> Hubei Aviation Precision Machinery Technology Co, Ltd, Xiangyang 441000, China.

**Abstract:** As a kind of high speed steel, QHZ has been widely used in industry for fine-blanking punches. However, because of complicated working conditions of fine-blanking, the service life of punches decreases as the number of repair increases. In this paper, the evolution of QHZ punches with different numbers of renovations was studied at the micro-scale level to investigate the influence of impact accumulation on their service life. The force condition and life of the punch during fine-blanking process were studied through finite element method. Electron backscatter diffraction was applied to investigate the microstructural evolution with the assistance of a scanning electron microscope. And the punch's micro-mechanical properties such as hardness and Young's modules were characterized by nano-indentation technique. It was found that the service life is closely related to the micro-evolution of QHZ during punching process. The deterioration of microstructure paralleling to the punching direction, such as the increase of grain size, the decrease of  $\Sigma 3$  grain boundary fraction, and the

\*Corresponding author, Tel/Fax: +86 27 87558148.  
Email: hust\_zxl@mail.hust.edu.cn (X. Zhang)

Download English Version:

<https://daneshyari.com/en/article/7176528>

Download Persian Version:

<https://daneshyari.com/article/7176528>

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