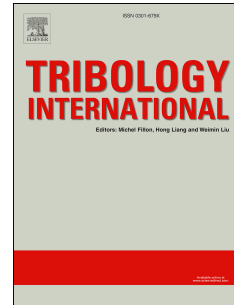


Accepted Manuscript

Analysis and assessment of robotic belt grinding mechanisms by force modeling and force control experiments

Dahu Zhu, Xiaohu Xu, Zeyuan Yang, Kejia Zhuang, Sijie Yan, Han Ding



PII: S0301-679X(17)30601-1

DOI: [10.1016/j.triboint.2017.12.043](https://doi.org/10.1016/j.triboint.2017.12.043)

Reference: JTRI 5027

To appear in: *Tribology International*

Received Date: 18 July 2017

Revised Date: 26 December 2017

Accepted Date: 27 December 2017

Please cite this article as: Zhu D, Xu X, Yang Z, Zhuang K, Yan S, Ding H, Analysis and assessment of robotic belt grinding mechanisms by force modeling and force control experiments, *Tribology International* (2018), doi: 10.1016/j.triboint.2017.12.043.

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.

Analysis and assessment of robotic belt grinding mechanisms by force modeling and force control experiments

Dahu Zhu^{a,b}, Xiaohu Xu^c, Zeyuan Yang^{a,b}, Kejia Zhuang^{d,*}, Sijie Yan^c, Han Ding^c

^a *Hubei Key Laboratory of Advanced Technology for Automotive Components, Wuhan University of
Technology, Wuhan 430070, China*

^b *Hubei Collaborative Innovation Center for Automotive Components Technology, Wuhan University of
Technology, Wuhan 430070, China*

^c *State Key Laboratory of Digital Manufacturing Equipment and Technology, Huazhong University of
Science and Technology, Wuhan 430074, China*

^d *Hubei Digital Manufacturing Key Laboratory, School of Mechanical and Electronic Engineering,
Wuhan University of Technology, Wuhan 430070, China*

Abstract

A tentative work from the perspective of cutting forces is carried out in this paper to analyse and assess the robotic belt grinding mechanisms. Firstly, a microscopic scale of cutting force model consisting of sliding, ploughing and cutting components is introduced, then the effects of force components on the machined surface roughness are explored based on the force control experiments, and finally a typical case on the robotic belt grinding of aero-engine blade with constant contact force is conducted to validate the practicality and effectiveness of force control. The results reveal two significant findings with respect to the high sliding force percentage and low cutting efficiency in comparison with the robotic belt grinding without force control.

Keywords: Robotic belt grinding; Force control; Surface roughness; Cutting mechanisms

* Corresponding author. Tel.: +86 27 87557324. E-mail address: zhuangkj@whut.edu.cn (K. Zhuang)

Download English Version:

<https://daneshyari.com/en/article/7002017>

Download Persian Version:

<https://daneshyari.com/article/7002017>

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