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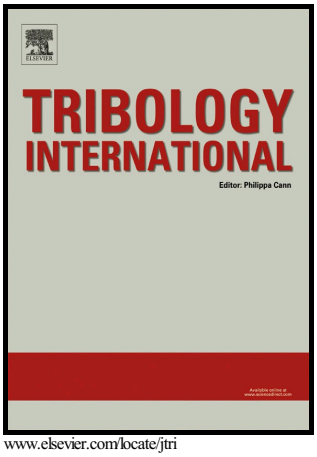

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PII: S0301-679X(17)30098-1
DOI: http://dx.doi.org/10.1016/j.triboint.2017.02.037
Reference: JTRI4618

To appear in: *Tribiology International*

Received date: 6 January 2017
Revised date: 20 February 2017
Accepted date: 23 February 2017

Cite this article as: Wolfgang Tillmann, Dominic Stangier, Nelson-Filipe Lopes-Dias, Dirk Biermann and Eugen Krebs, Adjustment of Friction by Duplex Treated, Bionic Structures for Sheet-Bulk Metal Forming, *Tribiolog International,* http://dx.doi.org/10.1016/j.triboint.2017.02.037

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ACCEPTED MANUSCRIPT

Adjustment of Friction by Duplex-Treated, Bionic Structures for Sheet-Bulk Metal Forming

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Keywords: Bionically-inspired structures, Sheet-Bulk Metal Forming, PVD-Duplex treatment, Friction

Abstract:

Bionic structures were applied on hardened AISI M3:2 and duplex-treated by means of plasmanitriding. Subsequently, a thin hard CrAlN coating was deposited on the substrate. The tribological properties of the structure systems were investigated in the full contact area, using identical friction partners (steel DP 600) of the forming process. The tribological behavior was analyzed in fundamental laboratory tests, using a modified tribometer and subsequently evaluated in application-orientated adapted ring-compression tests.

Bionic structures are suitable to locally adjust the friction condition and proved to be an appropriate method to control the material flow of sheet metals in bulk forming operations. However, process related micro burrs lead to a roughness increase during subsequent treatments, thus increasing the friction and adhesive effects.

1. Introduction

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