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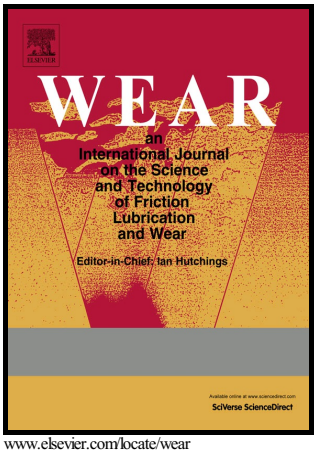

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PII: S0043-1648(18)30374-0
DOI: https://doi.org/10.1016/j.wear.2018.06.002
Reference: WEA102438

To appear in: *Wear*

Received date: 22 March 2018
Revised date: 30 May 2018
Accepted date: 1 June 2018

Cite this article as: Liangjie Mao, Mingjie Cai and Guorong Wang, Effect of rotation speed on the abrasive–erosive–corrosive wear of steel pipes against steel casings used in drilling for petroleum, *Wear,* https://doi.org/10.1016/j.wear.2018.06.002

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Abstract: This work aimed to investigate the effect of the rotational speed of drilling pipe on casing wear using a laboratory-scale, pin-on-disc machine. The material used for the cylindrical pin specimens was type G105 steel, and the disc was made from type N80 carbon steel. Tests were conducted under simulated drilling fluid conditions. The wear rate, surface features, surface profile of the wear product films, composition of the wear product, and variations in drilling fluid temperature under different rotational speeds of drilling pipe were analyzed. Wear rate varied with increasing rotational speed of drilling pipe, but not in a linear manner. The reasons for the wear behaviour were explained in terms of a combination of abrasive wear, erosive wear, and corrosive wear. The activity of the Cl- in the drilling fluid could influence the formation and properties of the protective film on the casing surface. The results of this study could serve as a reference for drilling engineers, product suppliers, and manufacturers in related industries in reducing casing wear.

Keywords: casing wear; rotational speed; N80 carbon steel

1 Introduction

A persistent problem in drilling engineering is the wear and friction of the casing when drilling