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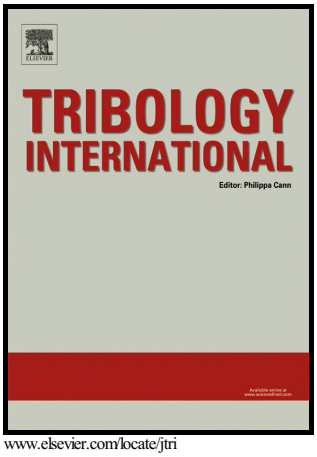

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PII: S0301-679X(16)30332-2
DOI: http://dx.doi.org/10.1016/j.triboint.2016.09.024
Reference: JTRI4371

To appear in: *Tribiology International*

Received date: 17 June 2016
Revised date: 5 September 2016
Accepted date: 17 September 2016

Cite this article as: B.M. Cavalcante, M.H. Shaterzadeh-Yazdi, P. Sollero, E.L Albuquerque and T. Doca, Analysis of a Cattaneo-Mindlin problem using the Boundary Element Method, *Tribiology International* http://dx.doi.org/10.1016/j.triboint.2016.09.024

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Analysis of a Cattaneo-Mindlin problem using the Boundary Element Method

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Abstract

In this paper, the Boundary Element Method is employed for the analysis of a Cattaneo-Mindlin problem. In order to obtain the stress over the contact surface, a quadratic continuous formulation for plane elasticity is proposed. In this method, the contact area is the initial unknown. Therefore, an algorithm is developed to compute the area and to discern between slip and stick regions. The Newton method is implemented to solve the resulting unconstrained non-linear system. The results are compared with the analytical solution showing a good agreement. To the authors knowledge this successful combination of the Newton's method with second order boundary elements for the solution of fretting problems with loading and unloading phases is an important and original contribution to the field.

Keywords: Boundary Element Method; Fretting Fatigue; Contact Mechanics.

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