

## Accepted Manuscript

Axisymmetric Problem on the Indentation of a Hot Circular Punch into an Arbitrarily Nonhomogeneous Half-Space

Leonid I. Krenev, Sergey M. Aizikovich, Yuriy V. Tokovyy, Yun-Che Wang

PII: S0020-7683(14)00487-9

DOI: <http://dx.doi.org/10.1016/j.ijsolstr.2014.12.017>

Reference: SAS 8598

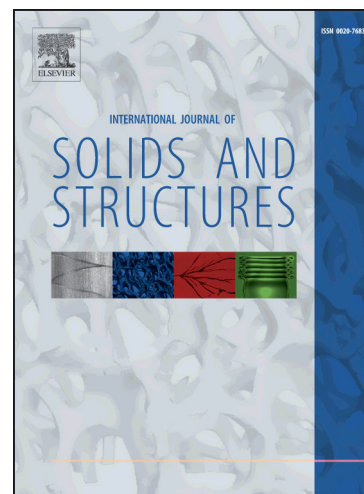
To appear in: *International Journal of Solids and Structures*

Received Date: 2 May 2014

Revised Date: 11 November 2014

Please cite this article as: Krenev, L.I., Aizikovich, S.M., Tokovyy, Y.V., Wang, Y-C., Axisymmetric Problem on the Indentation of a Hot Circular Punch into an Arbitrarily Nonhomogeneous Half-Space, *International Journal of Solids and Structures* (2015), doi: <http://dx.doi.org/10.1016/j.ijsolstr.2014.12.017>

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.



# AXISYMMETRIC PROBLEM ON THE INDENTATION OF A HOT CIRCULAR PUNCH INTO AN ARBITRARILY NONHOMOGENEOUS HALF-SPACE

Leonid I. Krenev<sup>a,b</sup>, Sergey M. Aizikovich<sup>a,b,\*</sup>, Yuriy V. Tokovyy<sup>c</sup>, and Yun-Che Wang<sup>d</sup>

<sup>a</sup> *Don State Technical University, Rostov-on-Don 344000, Russia*

<sup>b</sup> *South Federal University, Rostov-on-Don 344090, Russia*

<sup>c</sup> *Pidstryhach Institute for Applied Problems of Mechanics and Mathematics, National Academy of Sciences of Ukraine, Lviv 79060, Ukraine*

<sup>d</sup> *Department of Civil Engineering, National Cheng Kung University, Tainan 70101, Taiwan ROC*

**Abstract.** *This paper addresses an axisymmetric quasi-static contact problem on both thermal and mechanical interactions of a circular punch and a nonhomogeneous elastic half-space whose mechanical and thermophysical properties are assumed to be arbitrary functions of the depth coordinate. To solve the formulated boundary value problem, the technique of Hankel's integral transformation is used. Using the bilateral asymptotic method, an approximate analytical-numerical solution is constructed for the heat flux, boundary displacements of the half-space, and contact stress under the punch. Numerical implementation is performed for different dependences of the material properties on the depth of the half-space.*

**Keywords:** contact problem, circular punch, arbitrarily nonhomogeneous half-space, integral equations

## Nomenclature

|                 |   |
|-----------------|---|
| $r, \varphi, z$ | dimensionless radial, circumferential, and axial coordinates of the cylindrical polar coordinate system |
| $u, v, w$       | displacements in the $r, \varphi$ , and $z$ directions, respectively                                    |

\* Corresponding author: [saizikovich@gmail.com](mailto:saizikovich@gmail.com); Don State Technical University, Gagarin Square 1, Rostov-on-Don 344000, Russia; Ph: +7(928)9341398.

Download English Version:

<https://daneshyari.com/en/article/6748904>

Download Persian Version:

<https://daneshyari.com/article/6748904>

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