

## ANALYTICAL STUDY OF MECHANICAL PROPERTIES OF ROD-LIKE CENTRALIZERS FOR CASING TUBES

SHATSKYI Ivan<sup>1</sup>, VELYCHKOVYCH Andrii<sup>2</sup>, VYTVYTSKYI Ivan<sup>2</sup>,  
SENIUSHKOVYCH Mykola<sup>2</sup> & DUTKIEWICZ Maciej<sup>3</sup>

<sup>1</sup>Ivano-Frankivsk Branch of Pidstryhach-Institute for Applied Problems in Mechanics and Mathematics, NAS of Ukraine, Ukraine

<sup>2</sup>Ivano-Frankivsk National Technical University of Oil and Gas, Ukraine

<sup>3</sup>University of Science and Technology, Bydgoszcz, Poland

**Purpose.** The paper aims at studying the influence of the axial mobility of the centralizer's ends on the parameters of its rigidity and strength. These characteristics are necessary to assess the passability of the casing string and quality of well completions.

**Methodology.** Classical linear theory of shallow rods was used to model operating link of the centralizer. Physically the rod was taken for inextensible along the axis and elastic for bending.

**Findings.** The problem of the interaction of elastic rod casing centralizers with the wellbore wall is considered. The stress-strained state of the arcuate rod with six various fastening options in the conditions of point contact was studied. Analytical dependences between the contact force and the mutual convergence of the casing string and the borehole wall, as well as formula for the equivalent stress were determined. A way of fastening the rod along the axis of the pipe significantly affects these characteristics, in particular, presence or absence of reciprocal displacements of the ends of the rod in the axial direction. The engineering formulae of two-side estimations of rigidity and strength of real centralizers' designs were obtained.

They contain the researches, which were conducted within the project ББ-14/23/11, financed by National Academy of Sciences of Ukraine.

**Keywords:** casing centralizer, rod, contact interaction, stressed state, rigidity, strength

## INFLUENCE OF OVERHEATING AND COOLING RATE ON THE STRUCTURE AND PHYSICO-CHEMICAL PROPERTIES OF AL-CU ALLOYS

FILONENKO Nataliia<sup>1,2</sup>, BARTASHEVSKA Ludmila<sup>3</sup> & IVANOV Nikita<sup>1</sup>

<sup>1</sup>State institution "Dnipropetrovsk Medical Academy of Ministry of Health of Ukraine"

<sup>2</sup>Iron and Steel Institute named after Z. I. Nekrasov of the National Academy of Sciences of Ukraine (ISI NASU)

<sup>1</sup>Dnipro University of Technology, Dnipro, Ukraine

**Purpose.** Study the was to investigate the structural properties of Al-Cu alloys depending on the heating temperature of the alloy above the liquidus, the cooling rate [1-3].