

INFLUENCE OF DEFORMATION PARAMETERS ON DRILL STRING DYNAMICS

CHUDYK Igor¹ & GRYDZHUK Jaroslav¹

¹*Ivano-Frankivsk National Technical University of Oil and Gas,
Ivano-Frankivsk, Ukraine*

Purpose. Identifying the causes of additional energy consumption for deformation of the drill string.

Methodology. The study was conducted by analyzing the causes of deformations and justifying their impact on the dynamic parameters of the drill string.

Findings. The main deformations of the drill string are compression and tension of its sections in the axial direction, transverse bending of sections due to loss of stability, spiral twisting from axial load and torque, as well as curvature in curved sections of the well. The parameters of these deformations are the length of the half-wave and the bending arrow, the twist angle, length, pitch and curvature of the helical spiral, as well as the radius of curvature of the curved sections. The amplitude of the half-wave bending of the drill string is much larger than the cross-sectional radius of the wellbore, even at low and rotation speeds. As the rotation speed of the column increases, the amplitude of bending increases, the clamping forces of the half-wave ridges increase, which causes an increase in the amount of torque and, accordingly, the mechanical energy for its rotation. There is also an ovalization of cross sections of drill pipes due to the precessive rotation of sections of the column in the well. Due to ovalization, the position of the centers of mass of the cross sections of the columns and the hodograph of the forces of inertia changes. Ovalization significantly affects the change in the area of contact of the bent section of the drill string with the wall of the well and the pressure on the latter.

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Key words: drill string, deformation, energy, oscillations, stability

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SOME EFFECTIVE METHOD OF PROCESSING COPPER CONCENTRATE

KRAVCHENKO Volodymyr¹, HANKEVICH Valentyn²,
PASHCHENKO Oleksandr² & KUTS Oleksandra²

¹*Priaz National Technical University, Mariupol*

²*Dnipro University of technology, Dnipro, Ukraine*

Purpose. Using the special methods of processing it is proposed the forming of copper concentrate for further industrial usage.

Methodology. The studies were carried on using continuous smelting of copper concentrates for the production of copper from sulfide concentrates by pyrometallurgical method.

Findings. The article presents an analysis of copper production and demand. Various installations of continuous smelting of copper concentrates, their advantages and disadvantages are considered. An installation for continuous production of copper from sulfide concentrates by pyrometallurgical method is proposed. Studies have shown that the conditions of the proposed production are close to the conditions of thermodynamic equilibrium, which are favorable for the use of such a smelting furnace in a continuous cycle of copper production. The use of the described smelting process and unit increases the technical and economic (technological) performance of the entire process of continuous copper production. The economic and ecological aspects of copper production are considered.

Key words: continuous smelting, pyrometallurgical method, efficiency, copper concentrate

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