ABRASIVE WEAR OF STEEL AGAINST COKE

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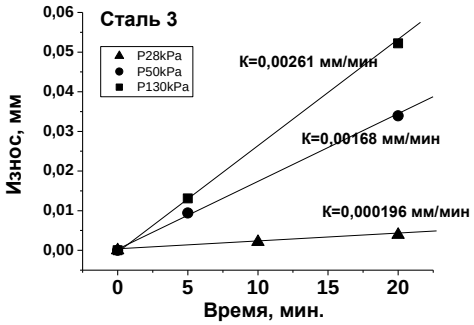
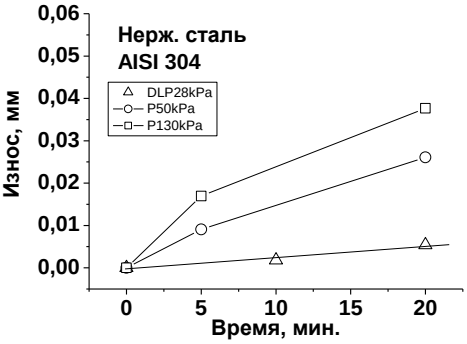
While designing the equipment for coke graphitization for American Energy Technologies Co there arised a problem of choosing thickness of details being effected with coke particles which move with different velocity and have different pressure. Also, there was a question about comparing the wear of details made of construction steel 3 and stainless steel AISI 304.

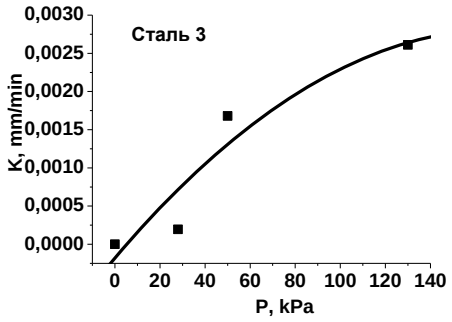
The wear of steel details against coke particles is conducted well on the immovable ring type unit of State Scientific Research Institute of Mechanical Engineering [1]. The chosen method of the experiment is based on friction of rotating round sample against the layer of particles being tested.

The experiment was performed in the following conditions. Sample spacing from axis of rotation is 0,15 m, frequency of rotation – 40 rev/min, sliding rate – 0,628 m/c. Two samples (1 – steel 3; 2 – stainless steel AISI 304) were tested simultaneously. There were applied different pressures while friction. For the experiment one separated coke fraction -1 mm+0,2 mm. It's possible to characterize sample modification more precisely by measuring the mass, than by defining changes in sizes. On this ground the wear was defined by mass loss, ΔP. Linear wear, ΔH, was defined on the basis that specific mass of both alloys is 7,8 g/mm^3.Temporarily linear wear modification for different pressures for both steel grades is shown in the figure.

Calculation of steel wear can be carried out considering that mechanism of the abrasive wear is affecting. On building a graphic chart of the wear rate dependence on pressure for the given friction rate one can define the wear rate for different pressures. Friction rate can be defined considering that at high friction rates the wear depends just on path passed.







Stainless steel changes its properties during friction. This is confirmed by graphics curvatures.