
Predicting the size of the area of abrasive grain bluntness for the various technological conditions

© D.V. Ardashev

South Ural State University (National Research University), Chelyabinsk, 454080, Russia

The main indicators that determine the performance of abrasive tools are the intensity and the degree of its bluntness. When considering the discrete contact of the grinding wheel with the workpiece one can use the size of the area of bluntness as such parameter. The suggested mathematical model of the area of abrasive grain bluntness for the first time takes into account the basic mechanisms of wear and tear — mechanical and physico-chemical. Mechanical wear is analyzed from the standpoint of the kinetic theory of strength of a solid body, and physico-chemical wear — from the standpoint of the theory of mass transfer. Since the analyzed wear of abrasive grains depends on the initial area of bluntness, this model for the first time takes into account nonlinear feedback on the size of the area of bluntness. Thus, the mathematical model is multifactorial and predicts the amount of wear of the abrasive tool in various process conditions.

Keywords: area of bluntness, wear of abrasive grains, kinetic theory of strength, physico-chemical wear.

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Ardashev D.V., Cand. Sci. (Eng.), associate professor of the Department “Technology of Mechanical Engineering” at South Ural State University. e-mail: dva79@inbox.ru
