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Improving the Performance Properties of Abrasive Tools at the Stage of Their Operation

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Abstract. Grinding performance largely depends on the durability of the abrasive tool. Developed and tested solid lubricant for impregnating the working surface of the grinding wheel, which increases its cutting ability and, as a result, reduces the number of edits. Reducing the need for frequent revisions of the abrasive tool reduces dust generation in the workshop and helps to prevent the occupational disease of the grinder - pneumoconiosis. It is established that the depth of cut when grinding according to an elastic scheme depends not only on the coefficient of grinding and the coefficient of friction, but on the magnitude of their difference.

Keywords: Higher · Fatty carboxylic acids · Friction coefficient · Grinding wheel · Solid lubricant

1 Introduction

Intensification of the industry leads to severe environmental pollution. The point of abrasive dust generated during grinding wheel grinding affects the respiratory organs.

Lightweight possess a very important property. They are constantly cleared of dust using phagocytes (a special type of white blood cells) but with a high content of abrasive dust in the air, the protective effect of the body weakens [1].

Dust accumulating in the lungs affects them, leading to a dash of pneumoconiosis. This disease is characterized by a slow transformation of the lung tissue from elastic ones that can significantly stretch and increase the area of air exchange when inhaling into a tissue with many scars (fibrosis) [2].

There are many types of pneumoconiosis. The most common and dangerous is silicosis, which is the result of a large amount of dust containing free silica entering the lungs Al_2O_3) And carborundum (silicon carbide SiC) And contains a small amount of silica SiO_2 - report content in a bunch of quartz (sand). Due to this content of silicon dioxide in abrasive dust, formed directly in the process of grinding, it is insignificant, but its content increases dramatically when editing the grinding wheel, used to restore

From Fig. 2, it can be seen that after the 14-min periods, the periods of grinding using an elastic scheme began to cut a continuous circle 5 times worse than intermittent ones. In Fig. 2 shows the dependence $(k_{s,pr} - fi)/(k_{s.sp} - f) = f(t)$, showing how the cutting ability of a continuous circle deteriorates over time compared to the cutting ability of a discontinuous impregnated circle of the same characteristic. From the graph it can be seen that after a 14-min grinding period, the cutting ability of the solid wheel decreased by 9 times compared with the cutting properties of the intermittent impregnated wheel.

4 Conclusion

Created and tested solid lubricant for abrasive machining of steels 12 × 2 H4A and 65Г, in which acetamide and potassium hydroxide are introduced along with stearic and oleic acid. This provides improved lubricating and cooling properties of the lubricant, thereby increasing the time between grinding wheel changes, which increases productivity and reduces the release of abrasive dust in the workplace of the polisher, which reduces the likelihood of occupational lung disease.

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