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Texturing the Lamellae of the Collector of Electrical Machines

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Abstract: The main reasons for reducing the dynamic stability of the collector node during operation are caused by the lack of precision in the manufacture of individual elements. As a result of the analysis of technologies and methods for the treatment of surfaces with specified parameters, a jet-abrasive method was reasonably adopted, which allows texturing surfaces with high productivity. To optimize the processing modes using this method, a mathematical model has been developed for the interaction of abrasive particles with the surface of a copper lamella. The optimization criterion was the microrelief of the surface, the removal of the material appeared as a restriction. In addition, full-scale optimization was carried out for clearly not present technological parameters in a mathematical model, such as abrasive concentration and processing time. Experimental studies were carried out that confirmed the adequacy of the simulation and the correctness of the chosen technology. On this basis, an experimental batch of collector nodes was manufactured under production conditions. In this batch, the three nodes were made of textured copper lamellas, and three - control, according to factory technology. Manufacturing tests have shown that texturing surfaces with an increase in roughness without removing the material and without changing the geometric parameters of the profile allows in the zone of contact of copper lamellae with insulating plates to increase the coefficient of static friction, which leads to an increase in pressing force and, thus, obtain guaranteed tension and solidity collector site.

Keywords: mathematical modelling, texturing, lamellae, roughness

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