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Faculty of Mechanical Engineering and Aeronautics

Department of Applied Mechanics and Robotics

DIPLOMA THESIS ABSTRACT

Multi-criteria optimization of the brushing process of the lock of the low-pressure turbine blade in the LEAP-1A engine.

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The thesis focuses on optimizing the parameters of the deburring process for sharp edges during the production of low-pressure turbine blades. The aim of the work was to extend the tool life while maintaining high detail quality, which is crucial in the aviation industry. Attention was paid to the possibility of responsibly optimizing production costs, bringing economic, ecological, and social benefits. The research revealed the existence of a local minimum in abrasive material consumption, which enables an increase in the number of parts processed with a single tool. The thesis emphasizes the necessity for further research on changes in materials and tool parameters to deepen optimization. The developed numerical model of the deburring process makes it possible to reduce the time and costs associated with testing. The implemented solutions confirmed the validity of the conducted research and indicated further potential for optimization. The thesis provides a solid base for future scientific research and industrial implementations. The introduction of new technological parameters supports the company's sustainable development by combining ecological and financial benefits.