OPINION

on the dissertation
for awarding the educational and scientific degree "Ph.D." in the

Field of Higher Education – 5. Technical Sciences
Professional Field – 5.1. Mechanical Engineering
Doctoral Program – "Material Cutting and Cutting Tools"

Author: Eng. Georgi Veselinov Karlovski
Topic: "Investigation of Turning Process Parameters when Using Quick-Change Tool Holders"
Member of the Scientific Jury: Assoc. Prof. Dr. Eng. Vladimir Petrov Dunchev

1. Topic and Relevance of the Dissertation

The competitive market increases productivity in modern mechanical engineering production. Modern production systems are oriented towards minimizing the time for production series, which requires rapid reconfiguration of machines. Quick-change toolholders allow a drastic reduction in the downtime of machines when changing tools. This leads to an increase in effective machine time, i.e. more production in a shorter time. Reduced setup time and lower maintenance costs lead to a faster return on investment. Increased accuracy and stability during repeated tool changes help reduce scrap and increase quality. The development of innovative designs of quick-change tool holders is a key element for flexible, automated and cost-effective production, which meets high requirements for speed, precision and adaptability. This shows the relevance and usefulness of the topic of the dissertation practical work.

2. Research Methodology

A methodology is used in the dissertation that includes theoretical analysis, design development of a quick-change tool holder and experimental confirmation of its effectiveness in production conditions. An innovative design of a quick-change tool holder is proposed and implemented. The combination of analytical, experimental and applied approaches testifies to the depth of the research conducted and a good knowledge of modern requirements in the field of scientific problems.

3. Contributions of the Dissertation

I accept the proposed contributions and summarize them as follows:

Scientific and Applied Contributions

- An innovative design for quick-change toolholders with an epitrochoidal profile has been developed, ensuring high-centering accuracy and stable fastening with minimal deviations, suitable for both rotary and prismatic tools;
- Mathematical models have been developed to describe the influence of cutting speed and feed rate on the 2D roughness parameter Ra and the tool durability.

Applied Contributions

- The implementation of quick-change toolholders with an epitrochoidal profile leads to a significant quality of productivity;
- The use of lubricating and cooling fluid ECOCOOL MACH 40 leads to a reduction in the dispersion of diametrical and axial dimensions, thus increasing the accuracy of processing;
- In production conditions, it has been shown that the developed design provides increased efficiency due to the reduced setup time and improved quality of the processed surfaces.

4. Publications and Citations Related to the Dissertation

In The dissertation work, publications are listed both on the topic of the dissertation and beyond:

- Scientific articles presented at national and international forums;
- Publications in peer-reviewed journals in the field of mechanical engineering;
- Co-authorship of utility models and patents, some of which are directly related to the topic of the dissertation.

The number and quality of the publications fully meet the requirements for the defense of the Ph.D. degree.

5. Authorship of the Results obtained

The doctoral student is the sole author of two publications on the dissertation, and in the rest, he is the first author. This gives me reason to believe that M. Eng. Georgi Veselinov Karlovski has a major contribution to the results obtained in the dissertation work.

6. Opinions, Recommendations, and Remarks on the Dissertation

The dissertation is well-structured and written. The experimental research conducted is thorough and well-founded. I have no substantial remarks of principle.

7. Conclusion

I consider that the presented dissertation meets the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria. The results achieved give me reason to recommend that the educational and scientific degree "Ph.D." be awarded to

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Date: 28.07.2025 **Signature:**

/Assoc. Prof. Ph.D. Eng. Vladimir Dunchev/