STATEMENT

on a dissertation for an acquisition of the educational and scientific degree "Phd" in

5. Technical Sciences”
professional field – 5.1 Mechanical Engineering,
doctoral program – Cutting of materials and cutting tools

Author: M.Eng. Georgi Veselinov Karlovski
Topic: Study of the parameters of the turning process when working with quick-change tool holders
Member of the scientific jury: Prof. Phd Galina Nikolcheva, Technical University of Sofia

1. Topic and relevance of the dissertation

The topic of the dissertation is the study of the parameters of the turning process when working with quick-change toolholders. Modern CNC machines are equipped with automated magazines with over 100 tools, the change of which must be done in seconds. For the effective operation of these machines, the quality of the cutting tools and toolholders play a key role. In this regard, the present work proposes an innovative design of a universal toolholder, through which the efficiency of the technological process is improved when machining rotary parts on Swiss-type CNC lathes. All studies of the toolholder were carried out in working conditions, which is another prerequisite for the significance of the work for mechanical engineering practice.

From the above, I define the topic of the dissertation as extremely relevant, promising, significant and timely for modern mechanical engineering production.

2. Research methodology

The aim of the dissertation is to optimize the cutting mode when turning on CNC machines with an innovative design of a quick-change toolholder. To achieve the set goal, comparative studies of the parameters (average roughness - Ra and durability) of the CNC turning process when machining with a monolithic toolholder and with the created innovative quick-change toolholder have been carried out, as well as a study of the influence of the lubricating and cooling fluid supplied through the body of the innovative quick-change toolholder on the average roughness of the machined surfaces.

Two experiments were conducted with a standard and a quick-change holder. In order to compare the obtained experimental results for the average roughness of the machined surfaces from the two experiments, a comparative statistical analysis was performed. It includes testing two statistical hypotheses:

- equality of variances of two random variables;
- equality of mathematical expectations of two random variables.

The estimates of the dispersions Si2 are determined after checking their homogeneity - Sin2, according to the Cochrane criterion.

The hypothesis of equality of the roughness dispersions in the two experiments was checked using the Fisher criterion. To test the hypothesis of equality of the mathematical

expectations of the roughness of the treated surfaces in the two experiments, the Student criterion was used.

The chosen methodology fits very well with the goals and objectives of the work.

3. Contributions of the dissertation work

I acknowledge all of the author's contributions: scientific and applied.

For me, the main contribution is the developed and supported by a utility model design of a quick-change tool holder designed for CNC metalworking machines and the implementation of this innovative design in regular production.

4. Publications and citations of publications on the dissertation

The doctoral student has 5 publications on the dissertation. Two are independent, and in the remaining three he is in first place. One of the publications is in Scopus. There is no data on citations.

5. Authorship of the results obtained

The dissertation was developed under the supervision of Prof. Dr. Eng. Irina Alexandrova. The doctoral student's work is characterized by a thorough knowledge of the current state of the issues under consideration. His personal contribution is also confirmed by the fact that out of the 5 publications presented on the dissertation, two are independent, and in the other three he is in first place. All this gives me reason to state that the contributions in the work and in the publications are the personal work of the doctoral student.

6. Opinions, recommendations and remarks on the dissertation

The dissertation is structured and written at a very good scientific level. . The fact that a huge number of studies have been done and all studies have been conducted in production conditions also makes an excellent impression.

I have no remarks on the presented dissertation. My recommendation to the doctoral student is to continue his successful scientific research activity in the future and to participate in conferences abroad indexed by SCOPUS and Web of Science, as well as to publish in international journals, which will make his results better recognizable by the scientific community.

7. Conclusion

I find that the results obtained by M. Eng. Georgi Veselinov Karlovski are original and fully comply with the requirements for a dissertation for the acquisition of the educational and scientific degree "Doctor". The developments in the dissertation are described competently and in the necessary completeness, the conclusions and inferences are very well constructed and argued.

The scientific-applied and applied contributions obtained in the dissertation work demonstrate a high educational level and accumulated research experience with achieved and practical results in a relevant field of modern mechanical engineering.

I believe that the presented dissertation meets the requirements of the Act on the Development of Academic Staff in the Republic of Bulgaria. The achieved results give me reason to propose that the educational and scientific degree "doctor" be acquired by M. Eng. Georgi Veselinov Karlovski

in the field of higher education –
5. Technical Sciences,
professional field - 5.1 Mechanical Engineering,
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Date: 12.08.2025

Scientific Jury Member:
/prof. Phd G. Nikolcheva/