

RECENZIA

according to a competition for the academic position of "associate professor" in scientific field 5. Technical sciences, professional direction 5.1. mechanical engineering, specialty "Automation of engineering work and systems for automated design", announced in SG no. 32 of 09/04/2024 and on the website of Plovdiv University "Paisiy Hilendarski" with candidate: chap. Assistant Dr. Eng. Emil Georgiev Velev

Reviewer: Prof. Ph.D. Eng. Vasil Stefanov Kostadinov

Pursuant to Order RD-21-1415/07/08/2024 of the Rector of Plovdiv University "Paisiy Hilendarski"

1. General and biographical data

The competition has been announced for the needs of the "Mechanical Engineering and Transport" department at the Faculty of Physics and Technology. According to the announced competition, documents were submitted by only one candidate - chap. Assistant Professor Emil Georgiev Velev, Ph.D.

Emil Georgiev Velev was born in the city of Plovdiv in 1964. He completed his higher education at the Technical University-Sofia, Branch Plovdiv, majoring in "Technology of Mechanical Engineering and Metal Cutting Machines". In 2015, he defended his doctoral thesis on the topic "Development and research of new cycloid gear pairs for gerotor hydromotors". He began his professional career as a designer and programmer at "ZAE" Plovdiv and continued at the company ET "Krastets-Georgi Velev" - Plovdiv, where he held the position of programmer. From 2016, he entered Plovdiv University "Paisiy Hilendarski" as an assistant, and from 2018 until today he is the main assistant, in the Department of "Mechanical Engineering and Transport" at the Faculty of Physics and Technology.

2. General description of the presented materials

The candidate has submitted the following works for participation in the competition for associate professor:

2.1. Independent monographic work entitled "Manufacturing of metal parts using additive technologies".

The monographic work has 189 pages. It was published by "FastPrintBooks" Publishing House Plovdiv in 2024 with ISBN 978-619-236-514-1 and was reviewed by Prof. Dr. Eng. Georgi Mishev and Assoc. Dr. Eng. Velko Rupetsov.

2.2. Scientific publications – 21 pieces.

The scientific publications presented in the competition can be presented in the following way:

- Reports in international scientific conferences abroad – 2 issues [G 7.1], [G 7.2] – 13.34 points;
- Reports from international conferences in Bulgaria - 9 pieces [G 7.3], [G 8.1], [G 8.2], [G 8.3], [G 8.4], [G 8.7], [G 8.13], [G 8.15], [G 8.16] – 93.87 points;
- Reports in national conferences – 10 pieces [G 8.5], [G 8.6], [G 8.8], [G 8.9], [G 8.10], [G 8.11], [G 8.12], [G 8.14], [G 8.17], [G 8.18] – 160.00 points;
- The scientific publications that are referenced and indexed in world-famous databases with scientific information - 3 pieces - [G 7.1], [G 7.2], [G 7.3] – 21.34 points;
- Scientific publications in non-refereed journals with scientific review or in edited collective works are 18 - [G 8.1-18] - 245.84 points.

2.3. Scientific publications in connection with the dissertation - 3 nos.

The total number of works with which the candidate participated in the competition is 21 works.

I do not accept 4 papers for review for the following reasons:

- Monographic work specified in point 2.1 - 1 copy;
- Scientific works, indicated in point 2.3 I report, but do not review - 3 issues;

I accept 17 papers for review. The candidate's participation in the peer-reviewed works is as follows:

- He is an independent author in 10 works - [G 8.4], [G 8.5], [G 8.6], [G 8.7], [G 8.8], [G 8.9], [G 8.10], [G 8.11], [G 8.12], [G 8.13];
- Second author is in 3 works - [G 8.3], [G 8.14], [G 8.18];
- Third author is in 3 works - [G 8.1], [G 8.2], [G 8.17];
- Fifth author is in 1 work - [G 7.3];
- The sixth author is in 3 works - [G 7.1], [G 7.2], [G 8.15];
- Seventh author is in 1 work - [G 8.16].

Of the publications presented in the competition, 16 are in Bulgarian and 5 are in English. There are 7 scientific publications on the topic of the competition.

3. General characteristics of the candidate's research and applied scientific activity.

Thematically, the publications of assistant Professor Emil Georgiev VeleV can be systematized in the following four areas:

- Computer simulation of processes 7 pieces - [G 7.1], [G 7.2], [G 8.7], [G 8.12], [G 8.13], [G 8.15], [G 8.16];
- Use of cycloid gears 6 pieces - [G 8.1], [G 8.2], [G 8.3], [G 8.9], [G 8.13], [G 8.14];
- Application of materials to reduce environmental pollution 3 pieces - [G 8.4], [G 8.5], [G 8.10];
- Automation of engineering work - 7 items [G 8.2], [G 8.6], [G 8.8], [G 8.15], [G 8.16], [G 8.17], [G 8.18].

The candidate also demonstrates significant research and development activity. As can be seen from the attached reference (sl_14001), the applicant took part in 2 national research projects in the period 2017-2024. There is also outgoing mobility for the purpose of

research activity lasting 3 months at the University of Craiova, Romania in the period from 01.09.2023 to 01.12. 2023 under project BG05M2OP001-2.016-0026 AKADEKOS.

4. Evaluation of the pedagogical preparation and activity of the candidate.

I assess the pedagogical qualification of the candidate and his work as a teacher at the level of the requested scientific title "associate professor". He lectures on the following academic disciplines for the bachelor's and master's degrees:

- Automation of engineering production;
- Heat treatment of metals;
- Processing of metals by plastic deformation;
- Programming and setting of metal cutting machines with CNC;
- Digital technologies for 3D CAM and CNC machines;
- Programming of CNC machines with CAM systems;
- Computer analysis and simulations.

The candidate participated as a lecturer at the University of Craiova, Romania under project BG05M2OP001-2.01-0026 "Innovative model for modernization of higher education by creating an academic ecosystem Varna Free University "Chernorizets Hrabar" - Technical University - Varna - Plovdiv University "Paisii Hilendarski".

Under his leadership, 7 graduates have defended and the works of 6 graduates have been reviewed.

5. Basic scientific and applied scientific contributions

The contributions contained in the candidate's works can be attributed to the following groups:

5.1. Scientific contributions (creation of new classifications, research methods, new constructions and technologies)

- A methodology for constructing a roller hydromachine has been created, with the dimensions of the rollers determining, which facilitates the design of gerotor hydromotors [G 8.2].
- A theoretical model is proposed for improving the technical parameters of a hydromotor by changing the profile of the gerotor pair [G 8.3]

5.2. Applied scientific contributions (obtaining and proving new facts and creating new classifications, methods, constructions, technologies, schemes).

- A methodology for restoring the gerotor pump of automotive hydraulic boosters is proposed [G 8.14];
- The influence of the diameter of the inflow during injection molding with the use of a hot nozzle was investigated by using the SolidWorks software product [G 8.12];
- The processes of cavitation in hydromotors were studied by using computer simulation [G 8.13].

5.3. Applied Contributions

- New types of gear pairs for gerotor hydromotors have been proposed, as well as a methodology for their generation has been created [G 8.1], [G 8.2];
- Research is the practical possibility of using different types of plastic with the same tool by using SolidWorks finite element analysis program [G 8.7], [G 8.12];
- A practical approach is proposed for the restoration of a gerotor pump used in the hydraulic amplifiers of a car [G 8.14];
- The advantages of additive manufacturing in mechanical engineering are shown, as well as its advantages over conventional manufacturing of details [G 8.6];
- A tooth-depth comb was made using a thread-erosion machine through specific profiling [G 8.8].

5.4. Citations

13 citations of works are presented, distributed as follows:

- In scientific publications referenced or indexed in a world-renowned database of scientific information 3 nos. - [G 8.10], [G 8.11], [G 8.12] – 40 points;
- In non-refereed journals with scientific review 4 nos. - [G 8.10], [G 8.12], [G 8.13], [G 8.19] – 18 points;
- In 6 monographs - [G 7.1], [G 7.2], [G 8.3] [G 8.11], [G 8.15], [G 8.16] – 21 points.

6. Significance for contributions to science and practice.

On the face are scientific, scientific and applied contributions. They enrich the theory, teaching material and practice in the field of the announced competition on "Cutting materials and cutting tools".

A significant volume of the methodical and analytical part of his scientific activity is also implemented in the educational process.

The information presented in points 2 and 3 gives reason to claim that most of the contributions are his personal work or were obtained with his decisive participation.

The citations indicated in point 5.4 speak of the recognition of the candidate by the scientific circles at home and abroad.

The quantitative indicators of the criteria for the occupation of the academic position "associate professor" have been met. The indicators from groups D and D are overfilled and are as follows:

- D 267.18 points;
- D 79 points.

There are no data on implementation and obtained economic effect.

7. Critical notes and recommendations

In the candidate's works, I did not find any gaps of a principled or discursive nature - such as literary ignorance, wrong statements, incorrect methodology, incomplete analysis or incorrect summary of the results. When publishing future works, it is necessary, the conclusions and contributions to them should be more specific and precise. There are notes of a secondary nature, which should be accepted as recommendations for the work of the

candidate and the future team of assistants and doctoral students he leads. They are given to him in advance.

8. Personal impressions and opinion

I do not personally know the candidate, Dr. Eng. Emil Georgiev Velev. I believe that he is formed as a qualified specialist and can be characterized as a recognized researcher and educator in the field of mechanical engineering technology.

Ch. Emil Georgiev, assistant professor, Ph.D., continues to improve his qualifications through various specializations, as well as to carry out various public activities, detailed in appendices [17. Other documents: Appendix SW, assistant dr. Eng. Emil Velev].

CONCLUSION

Based on my familiarity with the presented scientific works, their significance and the scientific, scientific and applied contributions contained in them, I find it reasonable to give my positive assessment and to recommend the Scientific Jury to prepare a report-proposal to the Faculty Council of Physico-Technology faculty for election of ch. Assistant Professor Emil Georgiev Velev, Ph.D., in the academic position of "docent" at Plovdiv University "Paisiy Hilendarski" in the professional direction: 5.1. Mechanical engineering, scientific specialty "Automation of engineering work and systems for automated design".

08/20/2024
cityof Ruse

REVIEWER:
/prof. dtn Vasil Kostadinov/