



SCIENTIFIC OPINION

on a contest for academic position "Associate Professor" at
professional direction 5.1. Mechanical Engineering, specialty Materials Science and
Technology

announced in State Journal, edition №2/05.01.2024

with candidate Assist. Prof. PhD Eng. Tatyana Mitkova Mechkarova

Member of the scientific jury: Assoc. Prof. PhD Eng. Momchil Galinov Manov

1. General characteristics of candidate's research and scientific activities.

To participate in the contest for academic position of "Associate Professor", the candidate Assist. Prof. PhD Eng. Tatyana Mechkarova has presented as follows:

1. Scientific publications, united as equivalent to a monography, presented in editions referenced and indexed in world databases with scientific information - 11.
2. Scientific publications in non-refereed journals with scientific review - 37.
3. Other documents certifying the course of scientific research and scientific activity over the years.

The scientific output of Assist. Prof. PhD Eng. Tatyana Mechkarova is in the field of her professional specialization. It is related to the study of the interrelationships between the structure and properties of various metallic and non-metallic materials, establishing the influence of the parameters of various technological processes with application in mechanical engineering on the structure and properties of the materials. It is noteworthy that part of the candidate's scientific output is related to computer modeling of various processes and technical means, regression and simulation analyses, which, in my opinion, testifies to a broad research horizon and scientific competence in the field of mechanical engineering.

In addition to the publication activity, Assist. Prof. PhD Eng. Tatyana Mechkarova has participated in 12 international scientific conferences and in 3 scientific and developments, of which 2 laboratories and one research complex focused on conduction of various researches in her professional field. The candidate is the head of 9 research projects at university level, most of which are related to the professional field.

2. Evaluation of the candidate's pedagogical training and activities.

Despite the significant workload in terms of research and scientific work, Assist. Prof. PhD Eng. Tatyana Mechkarova is a leading lecturer to students with a bachelor's degree from Technical University - Varna in 5 subjects and laboratory exercises in 8 subjects, with average annual workload of 450 classes. The candidate was the supervisor of 5 graduate programs with a bachelor's degree and another 5 graduate programs with a master's degree. She has developed 2 study programs for bachelor's degree in her professional field. Candidate's commitments in terms of pedagogical training include 8 mobilities under the Erasmus program for the last 5 years, related to familiarization with teaching

methods, testing and visits to scientific research bases. In addition, the candidate has completed 3 professional qualifications and 3 courses related to her professional field.

3. Fundamental scientific and scientific-applied contributions.

The scientific papers presented for participation in the contest for academic position "Associate Professor" by candidate Assist. Prof. PhD Eng. Tatyana Mechkarova have a significant contribution to the development of science and practice. After my thorough acquaintance with them and according to the attached list of scientific works with summaries in English and Bulgarian, the contributions from the research activity can be systematized as follows:

3.1 Basic scientific and scientific-applied contributions from scientific publications, united as equivalent to a monography, presented in publications referenced and indexed in world databases with scientific information on the topic "Researching the structure and properties of materials"

Scientific and applied contributions:

3.1.1 Three simulation models based on the finite element method have been developed, showing the distribution of both temperature fields and allowing the simultaneous determination of the magnitudes and distribution of stresses under different machine loads using software products - (publications B.4.1 , B.4.2, B.4.3);

3.1.2 An algorithm was developed for computer modeling of processes related to cyclic fatigue and their influence on the initiation and development of cracks - (publications B.4.8, B.4.9, B.4.10).

Applied contributions:

3.1.3 From the investigated welding joints, data was obtained experimentally, which can be used in the design of machines and equipment from the chemical, oil and gas industry, as well as for the optimization of existing technologies for the repair of expensive equipment - (publications B.4.3, B.4.4, B.4.5, B.4.9, B.4.10);

3.1.4 During the conducted studies of composite materials with a polymer matrix, the interrelationship between the composition of the matrix and the type of the reinforcing phase was established. The obtained mechanical characteristics can be used in the construction of elements of small-tonnage shipbuilding and the chemical industry - (publications B.4.6, B.4.7, B.4.11).

3.2 Fundamental scientific and scientific-applied contributions from scientific publication in non-refereed peer-reviewed journals:

Thematically, the scientific works from this point can be systematized as follows:

3.2.1 Research and modeling of technological processes - 8 publications (G.8.10, G.8.13, G.8.16, G.8.18, G.8.20, G.8.21, G.8.23, G.8.24).

Scientific and applied contributions:

3.2.1.1 3D simulation models based on the finite element method have been developed, showing the interrelationship between the technological mode parameters and the mechanical and structural ones.

Applied contributions:

3.2.1.2 Benches for mechanical tests and laboratory installations for corrosion and stress corrosion of materials have been developed;

3.2.1.3 Data were obtained experimentally from the study of various mechanical characteristics of the materials, which were implemented in algorithms and computer simulation models to track the influence of changes in the structure on their properties in different operating conditions.

3.2.2 Study of the structure and properties of materials - 22 publications (G.8.1, G.8.6, G.8.7, G.8.8, G.8.9, G.8.14, G.8.15, G.8.16, G.8.22, G.8.25, G.8.26, G.8.27, G.8.28, G.8.29, G.8.30, G.8.31, G.8.32, G.8.33, G.8.34, G.8.35, G.8.36, G.8.37).

Scientific and applied contributions:

3.2.2.1 Methods have been developed for researching the structure and properties of materials;

3.2.2.2 The influence of surface plastic deformation on the micro structural changes affecting the improvement of the mechanical characteristics in the surface layer (hardness, wear resistance, oil wedge, internal compressive stresses) of structural medium carbon steels was determined.

Applied contributions:

3.2.2.3 Useful experimental models have been developed that can serve in the implementation of further developments and scientific research.

3.2.3 Experimental statistical modeling and regression analysis – 7 publications (G.8.2, G.8.3, G.8.4, G.8.5, G.8.17, G.8.19, G.8.22).

Scientific and applied contributions:

3.2.3.1 Experimental statistical algorithms were developed, through a three-factor experiment and regression analysis, to trace the interrelationship between technological mode parameters and the structure and properties of materials.

Applied contributions:

3.2.3.2 A theoretical-experimental study of the relationship between the technological parameters of the processes and the quality characteristics of the obtained surface layers was carried out. A three-factor experiment was conducted to determine the impact of the factors on the quality of the resulting surface.

Of the scientific works presented in points 3.1 and 3.2 under this contest, 4 are independent (G.8.12, G.8.13, G.8.14 and G.8.15). In collective publications, the candidate is in first place in 13 of them (G.8.3, G.8.5, G.8.6, G.8.7, G.8.18, G.8.19, G.8.21, G.8.24, G.8.27, G.8.29, G.8.31, G.8.34 and G.8.35). This, as well as the submitted documents for participation in the contest for academic position of "Associate Professor", gives me reason to state that the presented scientific production and the contributions therein are the personal work of the candidate.

In the information presented by Assist. Prof. PhD Eng. Tatyana Mechkarova, the large number of citations in scientific publications referenced and indexed in world databases with scientific information (18) is impressive. A large part of these citations are at significant international scientific forums with well-presented multinational participation, which once again testifies to the quality and significance of the candidate's scientific output.

The above shows that Assist. Prof. PhD Eng. Tatyana Mechkarova is a well-rounded researcher with solid theoretical knowledge and sufficient practical experience in the field of materials science and technology. This gives me a reason to place a high general assessment on the research and scientific-applied activity.

4. Significance of contributions to science and practice.

The total number of scientific works presented for participation in the competition for the academic position of "Associate Professor" by Assist. Prof. PhD Eng. Tatyana Mechkarova is 48. Of them, 11 are scientific publications, united as equivalent to a monography with topic "Research of structure and properties of materials", presented in publications referenced and indexed in world databases with scientific information, 37 of which are scientific publications in non-refereed journals with scientific review. The candidate has also submitted other documents certifying the progress of the scientific research and scientific-applied activities over the years.

According to the regulations for implementation of the law on the development of the academic staff in the Republic of Bulgaria, in order to meet the minimum national requirements for holding the academic position "Associate Professor", 400 points are required. distributed as follows:

According to indicator 1 – 50 points;

According to indicators 3 or 4 - 100 points;

According to indicators from 5 to 11 - 200 points;

According to indicators from 12 to 15 - 50 points.

After a detailed review of the information presented by the candidate Assist. Prof. PhD Eng. Tatyana Mechkarova, i found that she has collected the necessary points on the indicators as follows:

- According to indicator 1 – 50 points from the presented diploma for awarding the educational and scientific degree "PhD" No. TYB-HC-2015-062, issued on 03.12.2015;

- According to indicators 3 or 4 – 145.57 points based on 11 scientific publications presented, united as equivalent to a monography with topic "Research of structure and properties of materials", presented in publications referenced and indexed in world databases with scientific information;

- According to indicators from 5 to 11 – 301.7 points based on 37 scientific publications presented in non-refereed journals with scientific review.

- According to indicators from 12 to 15 - 180 points based on presented citations in scientific publications, referenced and indexed in world databases with scientific information - 18 items.

Based on the above, i can reasonably confirm that the candidate Assist. Prof. PhD Eng. Tatyana Mechkarova fulfills the minimum national requirements for holding the academic position of "Associate Professor" in professional direction 5.1. Mechanical Engineering, specialty Materials Science and Technology.

5. Critical notes and recommendations.

I have no objections to the scientific research work, scientific production and lecture activity of Assist. Prof. PhD Eng. Tatyana Mechkarova, but I would allow myself to make the following recommendations:

- it is necessary, if possible, for the candidate to deepen her activity regarding her participation in research projects at national and international level. Despite the serious activity in relation to lecturing, i consider for reasonable to recommend the candidate to develop, independently or in a team, textbooks, manuals and others with which to update the lecture base on the subjects on which she is a leading lecturer. This would enable the results of the candidate's research work and scientific output to become available to a wider audience and would appropriately complement the already established profile of a scientist and researcher.

CONCLUSION

Taking into account the above in my opinion, i give a high general assessment to the presented scientific works of the candidate Assist. Prof. PhD Eng. Tatyana Mechkarova. I believe that the level of the received scientific and applied contributions as a result of her work is high and in quantity they are sufficient. Based on this, i find it reasonable **to propose** Assist. Prof. PhD Eng. Tatyana Mitkova Mechkarova to hold the academic position "Associate Professor" in professional direction 5.1. Mechanical Engineering, specialty Materials Science and Technology.

Date: 22.04.2024

Заличена информация
по Регламент (ЕС)

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Signature:.....

/Assoc. Prof. PhD Eng. Momchil Manov/