OPINION

of the materials submitted for participation in the competition for „Associate Professor" in the field of higher education 6. Agricultural sciences and veterinary medicine, Professional field 6.5 Forestry, scientific specialty "Technology, mechanization and automation of the woodworking and furniture industry", in the discipline "Woodworking and cutting tools"

In the competition for **Associate Professor**, published in the State Gazette 102/01.12.2020 and on the web site of the University of Forestry with the code WWI-AsP-1120-51 for the needs of the Department of "Woodworking machines" at the Faculty of Forest Industry, as a candidate participates **Chief Assistant Professor Pavlin Biserov Vichev PhD.**, Faculty of Forest Industry, Department of "Woodworking machines".

Prepared the opinion: Prof. Slavcho Asenov Sokolovski Ph.D., Professor in Professional Field 6.5 Forestry, from University of Forestry / Retired

1. Brief biographical data for the candidate

Chief Assistant Prof. Dr. Pavlin Biserov Vichev, Ph.D., was born on October 11, 1978. He graduated in 2002 as a Bachelor of Science in "Woodworking and Furniture Production" and as a Master of Science in "Woodworking and Furniture Production", specialty "Woodworking Machinery and Facilities". In 2015 he defended his Ph.D. thesis on a subject "Study of the noise characteristics of a wood milling machine" with a scientific supervisor - Prof. Dr. Vesselin Brezin. From 2001 to 2009 he worked for the company Consult Engineering - KIM Ltd, as a designer and sales director. From 2010 to 2016 he was an Assistant Professor at the Department of "Woodworking Machines" at the University of Forestry, and from 2016 onwards he has been a Chief Assistant Professor.

The candidate pursued specialization studies in Slovakia (2014) and Austria (2017). He participated in seven training courses for advanced training. He speaks English and Russian. He is married and has two children.

Since 2015 he has been a member of the editorial board of the International Scientific Journal "Innovations in woodworking industry and engineering design", published by the Faculty of Forestry, University of Forestry. In 2020 he was a member of the program committee of the 9th International Conference "Wood & Fire Safety 2020", Slovakia. Since 2010 he has been a member of the organizing committee of the International Scientific Conference "Innovations in the forest industry and engineering design", organized by the Faculty of Forestry, University of Forestry.

He actively participates in the development of the material base at the University of Forestry, for which he was awarded by the Rector of the University of Forestry. He takes part in various events related to the presentation of the Faculty "Forest Industry".

2. Correspondence of the submitted documents and materials of the applicant with the rules for development of academic staff at the University of Forestry.

The submitted documents and materials of the candidate Chief Assist. Prof. Pavlin Vichev, Ph.D, are in full compliance with the requirements of the Rules for development of academic staff at the University of Forestry. He has presented his publications and their summaries in Bulgarian and English on electronic files, as well as proof of citations of his publications.

3. Assessment of the candidate's educational and pedagogical activities

Chief Assist. Professor Pavlin Vichev, Ph.D, lectures in the following scientific disciplines: Woodworking and cutting tools - part-time studies, Metal science - full-time and part-time studies, Interior acoustics - full-time studies. It can be seen also that the candidate runs tutorial sessions in the following scientific disciplines: Woodworking and cutting tools - full-time and part-time education, Interior acoustics - part-time education, Machines and tools for woodworking - full-time education, Production practice - full-time and part-time training, Complex practices - full-time training. The classes are mainly carried on at the Faculty "Forest Industry".

During last years he has fulfilled the teaching workload required according to the activity regulations of University of Forestry.

During the period 2018-2020, Chief Assist. Professor Pavlin Vichev, Ph.D, has been the head supervisor of 3 graduate students. He has prepared a total of 30 reviews and reports, 18 of which for Bachelor degree students and 12 for Master degree students.

4. Assessment of candidate's scientific, scientific-applied and publishing activities

General description of the presented materials.

Candidate Chief Assist. Prof. Pavlin Vichev, PhD, participates in the competition with:

- Monographs - 1;
- Books - 1;
- Publications (articles and reports for scientific forums) - 36, of which 17 in scientific journals and 19 in international scientific forums;
- Projects - 13.

The distribution of the documents according to group indicators of minimum requirements for acquiring the academic position "Associate Professor", scientific field 6. Agricultural Sciences and Veterinary Medicine, 6.5. Forestry is as follows:

- A1 – Dissertation work for obtaining a 'PhD' degree - 1. (A1.1);

- B3 – Habilitation work – monographs - 1; individual, 192 pages. (B3.1);
- G6 – Book published on the basis of a defended dissertation work for obtaining a 'PhD' degree – 1; individual, 170 pages. (G6.1)
- G7 - Scientific publications in journals that are referenced and indexed in a global database of scientific information (Web of Science and SCOPUS) – 9. (G7.1 to G7.9)
- G8 – Articles and reports published in non-referenced journals or published in edited collective proceedings – 27. (G8.1 to G8.27)

4.1 Participation in scientific, scientific-applied and educational projects

Chief Assist. Prof. Pavlin Vichev, PhD, participates in the competition with 3 scientific projects financed by the University of Forestry according to Regulation 9, 3 infrastructure projects, 3 national educational projects and 4 applied projects financed by the experimental forestries of the University of Forestry. He is the leader of 3 of them.

4.2 Characterization of published scientific results

In the presented for the competion of Chief Assist. Prof. Pavlin Vichev, PhD, a habilitation thesis-monograph "Acoustic characteristics of woodworking machines, processing by cutting", published by "Avangard Prima" Publishing House in Sofia in 2020, 192 pages, has been included in an appropriate manner.

The monograph summarizes the results of the conducted experimental research on the technical-acoustic characteristics of different woodworking machines. The requirements for determining the noise characteristics are presented, including the number and position of the referential points, the requirements for the cutting tools and the processed materials of woodworking machines, which have found the widest application in woodworking and furniture industry. Some factors influencing the noise characteristics of modern woodworking machines are considered, such as the type of cutting tools, the processed materials, the cutting mode (feed rate, cutting speed, thickness of the removed layer, etc.). A brief overview of other authors' research results in the field of noise caused by the work of woodworking machines is presented.

The monograph fulfills the requirements of the law for development of academic staff in Bulgaria and the Regulations for development of academic staff in University of Forestry.

In addition, a published book based on the defended thesis for the attribution of his PhD degree in 2015, on the subject "Study of the noise characteristics of a woodworking milling machine", 170 p, is presented.

The presented by the candidate for participation in the competition of a total of 36 articles, 17 are published in scientific reviews and 19 are published in proceedings of international scientific forums. There are almost twice as many publications abroad - 25, compared to those in Bulgaria - 13. The predominant number of publications is in English – 29, compared to those in Bulgarian - 9, of which 7 are individual, with one co-author - 5, with two co-authors - 12, with three or more co-authors - 14. In the co-authored publications Chief Assist. Prof. Pavlin Vichev, PhD, stands first in 11 publications, second in 7, third in 5 and fourth in 8 publications.

Considering the group of indicators "G" Chief Assist. Prof. Pavlin Vichev, PhD, gathers a total of 266, 81 points. The required minimum is 200 points.

4.3 Reflection of Candidate's Scientific Publications in Literature (known citations)

The candidate has presented 7 citations in referenced journals and proceedings of scientific forums, 3 of which are referenced and indexed in world databases (D13.1 - D13.3) and the other 4 in non-referenced journals reviewed by scientists (D15.1 - D15.4.).

Considering the group of indicators "D" Chief Assist. Prof. Pavlin Vichev, PhD, gathers a total of 65 points. The required minimum is 50 points.

4.4 Contributions to the candidate's work (scientific, scientific-applied, applied)

In the present opinion, the subject of evaluation of the candidate's contributions are the monograph and 36 scientific publications. The abstract and the edited book, which includes his PhD thesis, are not considered.

After careful analysis of the presented results in the accepted for their evaluation total of 36 publications and a monograph of the candidate in my Opinion and the requested by him claims for scientific, scientific-applied and applied contributions in them, I consider that:

The reference presented by Chief Assist. Prof. Pavlin Vichev, PhD, is structured thematically in the following important areas: research of the acoustic characteristics of woodworking machines processing by cutting, determination of the equivalent level of sound pressure, the workplace of woodworking machines operators, experimental studies on the force-energy parameters of the process of longitudinal flat and profile milling of wood on a milling tool, experimental research of the cutting mode on the quality of the milled surfaces of beech, white pine and oak wood parts. Dynamic models have been developed for the study of woodworking mill oscillations.

The most important scientific, scientific-applied and applied contributions of the presented research are as follows:

• Scientific contributions

1. The requirements for conducting a research on the acoustic characteristics of woodworking machines (WM), processing by cutting in relation to the requirements for the cutting tools, the processed materials, the shape and area of the referent surface and the number and location of the referent points on it have been systematized (B3.1).

2. A methodology has been developed for determining the equivalent sound pressure level, the workplace of (WM) operators, as a result of wood and wood-based materials processing by cutting. According to it, experimental studies were carried out to determine the noise load at the workplace of a milling device operator (G6.1; G8.5; G8.6).

3. A methodology has been developed and an experimental research has been carried out on force-energy parameters of the process of longitudinal flat and profile milling of solid wood on a milling machine (MM) with a low spindle location using different types of milling tools (G7.2; G8 .16; G8.17).

4. As a result of conducted experimental research the degree of impact of the cutting speed, the feeding speed and the thickness of the removed layer on the quality of the milled surfaces of beech, white pine and oak wood (G7.1; G7.7; G8.21) has been determined.

• Scientific and applied contributions

1. The impact of the design of the milling tools on the quality of the processed surfaces of solid wood parts, at different cutting speeds and at different feed speeds (G7.4) has been determined.

2. The variation of the roughness of the milled surfaces of white pine and beech wood depending on the frequency of rotation of the cutting tool, the speed of feeding and the thickness of the removed layer has been studied. It was found that the most important impact on the change of the roughness class is the feed rate, followed by the rotation speed of the milling machine (G7.7; G8.21).

3. The influence of the processed material and the cutting position on the sound pressure level as a result of the operation of a circular machine with a moving mass has been studied. Graphical functions representing the link between the different factors have been established (G7.3; G8.20).

4. The noise pressure level and the noise power level in octave frequency bands with mean geometric frequencies from 63 Hz to 16000 Hz of a MM with low position of the spindle depending on the cutting modes, the processed materials and the cutting tools are determined (G6.1).

5. The influence of the milling tool design and its frequency of rotation on noise load over the operator of a MM with low position of the spindle (G6.1; G8.6) have been studied.

6. Graphical functions of the feed and cutting speed and the thickness of the removed layer influence on the level of noise emission during longitudinal flat milling of beech wood have been drawn (B3.1; G8.7).

7. The variation of vibration intensity of a MM with low position of the spindle depending on the cutting and feeding speeds and the thickness of the removed layer, as well as the impact of the cutting tool on the general dynamic behavior of the machine have been determined (G8.10; G8.15).

8. The noise-absorbing characteristics of white pine wood in the frequency range from 100 Hz to 2000 Hz have been determined. They influence both the sound pressure level generated during their processing by cutting and the acoustic parameters of the rooms in which the wood of these species is used in interior design (G7.8; G8.18).

9. The level of noise emission, in octave frequency bands with mean geometric frequencies from 16 Hz to 16000 Hz, the place of operator of a block saw and a panel dividing saw in operation mode of the tool with and without cutting have been determined (B3.1; G8 .22).

10. The impact of the cutting and feeding speeds, the thickness of the removed layer and the number of belts in the gear on the dynamic behavior of a universal woodworking milling machine (G7.9; G8.3; G8.14) is determined.

11. The variation of the power and the cutting force in longitudinal flat milling of beech and white pine depending on the cutting speed, the feeding speed and the surface of the removed layer have been determined (G8.16; G8.17).

12. The indicator of efficiency and effective power in sharpening, in forward and reverse move, in sharpening of flat knives with abrasive tools made of polycrystalline diamond (PCD) is determined. Specific consumption of PCD abrasive material is also determined (G7.5; G8.23).

13. Dynamic models of MM research have been developed, including:

- Free undamped and damped spatial oscillations of MM and its spindle (G8.8);
- Driven spatial oscillations of the MM and its spindle as a result of the imbalance of the cutting tool (G8.12; G8.13);
- Free undamped and damped spatial oscillations of the MM, its spindle and the rotor of the driving motor (G8.24);
- Driven spatial oscillations of the MM, as a result of the imbalance of the rotor (G7.6).

14. The influence of temperature, glue quantity and feeding speed at through wrapping of chipboard and MDF furniture with PVC foil on the bond strength between the materials and the foil has been determined (G8.4; G8.11; G8.19).

• Applied contributions

1. The influence of the number of V-belts on operation of MM cutting mechanism at idle and working speed (G8.14) has been established.

2. Natural frequencies and natural forms of MM free spatial oscillations, its spindle and the rotor of the driving electric motor (G8.9) have been determined.

3. Free damped spatial oscillations of the MM, the rotor and its spindle (G8.24) have been established.

4. Driven spatial oscillations resulting from the imbalance of MM rotor with low spindle position (G7.6) are established.

5. Considering the presented exhaustive survey, the degree of mechanization and automation of woodworking and furniture production (WFP) in Bulgaria during the period 1947 ÷ 1989 has been assessed. An analysis of the automation and digitalization in WFP after 1989 and its development tendencies has been made (G8.26; G8.27).

5. Assessment of the applicant's personal contribution

From the presented works of the candidate for his participation in the competition for "Associate Professor" I could consider that Chief Assist. Prof. Pavlin Vichev, PhD, has participated with 7 individual research works, and those in co-authorship have a leading role (he is the first co-author in 11 publications). As no separation protocols have been submitted for the co-authored articles, I accept that the contributions and participation in them are equally distributed among the co-authors.

This gives me the ground to accept that the listed above contributions for the competition for "Associate Professor" are individual contributions of the candidate or have been achieved with his active participation.

The achieved scientific, scientific-applied and applied contributions are significant for the scientific specialty, in which the competition "Technology, mechanization and automation of WFP" has been announced and will be useful for science and practice.

6. Critical remarks

I did not have any significant remarks in evaluating the research works and very-well prepared materials for the competition.

I would only recommend the candidate to present his contributions in a more summarized form, considering that some of which could be combined.

7. Personal impressions

As his former university professor I know Chief Assist. Prof. Pavlin Vichev, PhD, from his student years, and he has left me excellent impressions of him. As a lecturer he is a very responsible, communicative and active colleague.

The presented works for the competition complement and reinforce my experience with the activity and development of Chief Assist. Prof. Pavlin Vichev, PhD, as erudite lecturer with undeniable qualities of a scholar and creative researcher of valuable for the science, higher education, and practice scientific and application solutions.

The candidate is actively involved in creating professional contacts of the Faculty of Forest Industry with companies (Bosch, Festo, Technomebel, MOS Consult Ltd.), with the Branch Chamber of woodworking and furniture industry and other organizations. His participation in three infrastructure projects is an indicator of his creativity, and taking part in international scientific forums in more than six foreign countries proves his recognition abroad.

8. Conclusion

The achieved scientific, applied and pedagogical results of Chief Assist. Prof. Pavlin Vichev, PhD, their importance for the practice and for the learning process as well as his presented research activity gives me the reason to conclude that all the requirements of the Law for development of academic staff in Bulgaria and of the regulations for its application in the University of Forestry for the academic title "Associate Professor" are completely fulfilled. The total number of points of all the indicators gathered by the candidate is 481,81, which significantly exceeds the required minimum of 400 points.

In connection with the above, I propose Chief Assistant Professor Dr. Pavlin Bisserov Vichev, PhD, be elected "Associate Professor" in the discipline «Woodworking and cutting tools" in the Professional field 6.5 Forestry, scientific specialty "Technology, mechanization and automation of woodworking and furniture industry."

Prepared the opinion:

/ prof. Dr. Slavcho Sokolovski /

Opinion delivered to: