



REVIEW

on the materials submitted for participation in a 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 “Wood cutting and cutting tool”

In the competition for „Associate Professor“, published in the State Gazette, issue 102/01.12.2020 and on the 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 Assist. Pavlin Biserov Vitchev, PhD, Faculty of Forestry, Department of “Woodworking machines”.

Reviewer: Prof. Bozhidar Georgiev Dinkov, PhD, Professor in a Professional Field 6.5 Forestry, from University of Forestry, retired

1. Brief biographical data for the candidate

Chief Assistant Professor Dr. Pavlin Vitchev was born in Sofia, where he received his secondary education at the College of Communications. He graduated from the University of Forestry, Sofia, majoring in Woodworking and Furniture Production, with a bachelor's degree in 2004, and in 2008 obtained a Master of Woodworking Machinery and Equipment degree. From 2006 to 2009 he worked as a sales consultant and sales director at the Consult Engineering - KIM Ltd. After a competitive exam in 2010 he was approved as a full-time assistant at the Department of Woodworking Machines at the Faculty of Forestry. In 2015 he successfully defended his dissertation thesis entitled *Study on Noise Characteristics of Woodworking Milling Machine*. Since 2016 he has been a chief assistant professor at the Department of Woodworking Machines.

2. Compliance of the submitted documents and materials of the applicant to the Regulation for the Development of Academic Staff at the University of Forestry.

The documents and materials submitted by the candidate in connection with participation in the announced competition for the academic position of *Associate Professor* in professional field 6.5 Forestry, scientific specialty "Technology, mechanization and automation in the woodworking and furniture industry" fully comply with the Regulation for the Development of Academic Staff in University of Forestry, namely:

- Curriculum vitae using the European CV format;
- Copies of the Diploma for Higher Education certified by a notary for obtaining bachelor's degree, master's degree, and of the Diploma for Acquiring a Doctoral Degree;
- Official Note for the Current Academic Position; Medical Certificate; Criminal Record Certificate; Certificate of Internship in the required scientific field;
- Self-Assessment Report for Fulfilment of the Minimum National Requirements under Art. 2a, para. 2, 3 and 4 for the academic position of *Associate Professor* /using the University of Forestry format/ - 4 pages;
- List and classification of publications submitted for participation in the competition; list of professional activity and creative performances;

- Lists of: the contributions in the works submitted for participation in the competition; known citations; scientific, teaching and expert activities;
- Documents and written materials certifying professional and activities and creative performances under Art. 67, para. 2;
- Letters of appreciation from Festo Ltd. (Bulgaria); Fetool (Germany); Interior I (Bulgaria); Kastamonu (Bulgaria);
- Information Cards in Bulgarian and English in the required format;
- Summaries of the publications submitted for participation in the competition in Bulgarian and English;
- Scientific publications in full submitted for participation in the competition; photocopies of the known citations submitted for participation in the competition;
- Declaration under Art. 313 of the Penal Code for accuracy of the submitted information.

All documents for participation in the competition are submitted on paper and in electronic format.

3. Assessment of the candidate's educational and pedagogical activities (work with students and PhD students)

Chief Assistant Professor Dr. Pavlin Vitchev as a university lecturer has been assigned to teach students the following course: *Cutting Wood and Cutting Tools* - laboratory exercises to full-time first and second-year students in Technology of Wood and Furniture degree program and lectures and laboratory exercises to part-time third-year students; *Machines and Tools for Wood Processing* - laboratory exercises to full-time third-year students in Business Management degree program; *Interior Acoustics* – lectures and laboratory exercises to full-time second-year students in Engineering Design (Interior and Furniture Design) degree program; *Metal Science* - lectures to full-time and part-time first-year students in Technology of Wood and Furniture degree program and to full-time first-year students in Computer Technologies in the Furniture Industry degree program. He organizes and conducts the practical training of the full-time and part-time students majoring in Technology of Wood and Furniture; he is a member of the teaching staff on the combined practical training in *Machines and Tools for Wood Processing* course for students at the Faculty of Business Management and he conducts the practical training in *Cutting Wood and Cutting Tools* course.

Chief Assistant Professor Dr. Pavlin Vitchev has been the supervisor of three successfully defended theses in Technology of Wood and Furniture bachelor's degree program and has prepared reviews of 30 theses in the degree programs of Woodworking Machines and Furniture Production, Wood Technology, and Technology of Wood and Furniture.

He is an author or co-author in the preparation of the syllabi of the following courses: *Metal Science* for full-time and part-time students in Technology of Wood and Furniture degree program and for full-time students in Computer Technologies in the Furniture Industry degree program; *Interior Acoustics* for full-time students in Engineering Design degree program; *Machines and Tools for Wood Processing* for full-time students in Business Management degree program as a co-author with Assoc. Prof. Dr. Vasil Vlasev and Ch. Assist. Prof. Dr. Valentin Atanasov; *Cutting Tools and Processes* for full-time students in Computer Technologies in the Furniture Industry degree program as a co-author with Prof. Dr. Zhivko Gochev; *CNC Machines and Technologies* for full-time students in Computer Technologies in the Furniture Industry degree program as a co-author with Prof. Dr. Zhivko Gochev; *Practical*

Training in Industrial Setting for full-time and part-time students in Technology of Wood and Furniture degree program as a co-author with Prof. Dr. Zhivko Gochev.

For the provision of high-quality education to the students on the above courses, very good training facilities have been set up with the active participation of Chief Assistant Professor Dr. Pavlin Vitchev. For the needs of the learning process, wood samples and photos have been compiled to show the modes for effective cutting of softwood and hardwood materials using different cutting tools.

My general assessment is that Ch. Assistant Professor Vitchev conducts active pedagogical, educational and organizational activities that fully meet the requirements for holding the academic position of Associate Professor.

To ensure his good pedagogical preparation, Chief Assistant Professor Dr. Pavlin Vitchev took part in specialization courses at the Technical University of Zvolen, Slovakia and at the University of Applied Sciences, Salzburg, Austria, as well as training at the University of Forestry, Sofia, including courses in: *Development of Curricula, Plans and Programs Related to the Credit Transfer Accumulation System, Methodology of Academic Training, Use of Modern Teaching Methods, Communication Skills and Teamwork, Environmental Protection, Fundamentals of Information Technologies, Word Processing, Spreadsheets, Presentations and Business Graphics Systems and Blackboard Learn e-Learning Platform and Support Training.*

Chief Assistant Professor Dr. Pavlin Vitchev has been the coordinator of the University of Forestry in the implementation of two infrastructure projects. One of them was related to the construction of the BLUM Training and Demonstration Technocenter at the Department of Woodworking machines. The project was implemented in 2020 as a joint cooperation between the University of Forestry, Sofia and the companies Interior I (Bulgaria) and Julius Blum GmbH (Austria), and was funded through a donation made by both companies. The other infrastructure project was related to the construction of a Training and Demonstration Center for Hand Power Tools, and was implemented in 2019 jointly between the University of Forestry, Sofia and FESTOOL (Germany). Most of the funding was provided through donations by Teka, Tultechnik System, IKEA and JAF.

On 7 October 2020 Chief Assistant Professor Dr. Vitchev received an Appreciation Certificate by the Rector of the University of Forestry for his contribution to the construction and development of the training facilities at the University of Forestry.

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

General description of the submitted materials

Candidate Chief Assist. Prof. Dr. Pavlin Vitchev participated in the competition with:

- Monographs – 1 number (s);
- Books – 1 number (s);
- Publications – 36 number (s);
- Projects – 13 numbers (s).

4.1 Participation in scientific, scientific-applied and educational projects

- Research projects funded by the University of Forestry under Ordinance № 9 – 3 in number;
- National educational projects - 3 in number;

- Infrastructure projects – 3 in number;
- Scientific and applied projects funded by the training and experimental forest ranges of the University of Forestry – 4 in number.

4.2 Characterization of published scientific results

The publications can be classified as follows:

- Publications in scientific journals – 17 number (s):
 - in foreign refereed journal in Web of Science and Scopus – 2 pc.;
 - in Bulgarian refereed journal in Web of Science and Scopus – 3 pc.;
 - in foreign refereed journal outside Web of Science and Scopus – 6 pc.;
 - in Bulgarian refereed journal outside Web of Science and Scopus – 6 pc.
- Publications in proceedings of international scientific forums – 19 number (s):
 - in foreign refereed proceedings in Web of Science and Scopus – 4 pc.;
 - in foreign refereed proceedings outside Web of Science and Scopus – 15 pc.
- Publishing language:
 - In Bulgarian – 9 number (s);
 - In a foreign language – 29 number (s).
- Number of co-authors:
 - Without co-authors – 7 number (s);
 - With one co-author – 5 number (s);
 - With two co-authors – 12 number (s);
 - With three or more co-authors – 14 number (s).

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

The presented citations for participation in the competition are 7 incl.:

- Citations in peer-reviewed (refereed) or indexed scientific journals, series or conference proceedings in Web of Science and Scopus – 3 in number (№№ G13.1÷G13.3);
- Citations in non-refereed journals with scientific review or publications in edited collective volumes – 4 in number (№№ D15.1÷D15.4).

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

The candidate's contributions submitted are related to clarifying theoretical issues and solving scientific and applied problems in the field of cutting tools and processing of wood and wood-based materials by cutting. They are made in the following areas: quality of the treated surfaces; dynamic behaviour of cutting tools and technological equipment; force-energy indicators of the cutting process; acoustic studies depending on the processing modes and the cutting tools used.

Of the submitted materials, not accepted for review are the publications that are not related to the announced competition: publications on mechanization and automation in the woodworking and furniture industry in Bulgaria (G8.26 and G8.27), as well as publications related to tunnel lining of furniture details (G8.4; G8.11; G8.13). The dissertation and the

monograph are not reviewed as they were reviewed before their publication. Unreviewed publications and other materials submitted for participation in the competition are taken into account in the overall assessment of the academic achievements of the candidate.

1. Scientific contributions:

1.1. The requirements for conducting research on the acoustic characteristics of woodworking machines used for cutting have been systematized with regard to the requirements for cutting tools, processed materials, shape and area of the measuring surface and the number and location of measuring points on it (B3.1).

1.2. A methodology has been developed to determine the equivalent level of sound pressure, the location of the workplace of woodworking machine operators as a result of processing wood and wood-based materials by cutting. According to this methodology experimental studies were carried out to determine the noise load at the workplace of the operator of a shaper with a spindle at a low position depending on the cutting mode and the geometry of the cutting tools (G6.1).

1.3. A methodology has been developed and experimental studies have been conducted on the force-energy parameters of the process of longitudinal flat and profile milling of solid wood on a shaper with a spindle at a low position using different types of cutting tools. Assessments have been made on the degree of influence of the feed rate and the cutting area on the power and cutting force, the specific cutting force and the specific electricity consumption (G7.2; G8.16; G8.17).

2. Scientific-applied contributions:

2.1. Based on experimental studies, assessments have been made on the degree of influence of the cutting speed, feed rate and thickness of the removed layer on the quality of the processed surfaces of beech wood (*Fagus Sylvatica* L.), Scots pine (*Pinus Sylvestris* L.) and oak (*Quercus Petrea* L.), showing relationships in graphs that illustrate the correlation between the individual factors (G7.1; G7.7; G8.21).

2.2. The influence of the cutting tools' construction on the quality of the processed surfaces of solid wood at different frequency of tool rotation, at different cutting speed and different feed speeds respectively has been determined (G7.4).

2.3. The influence of the processed material and the cutting height on the sound pressure level as a result of the operation of a circular machine with a moving mass has been studied and graphical dependences representing the relationship between the individual factors were have been identified (G7.3; G8.20).

2.4. The sound pressure level and the sound power level in octave frequency bands with geometric mean frequencies of 63 Hz – 16000 Hz of a shaper with a spindle at a low position have been calculated depending on the cutting modes, the characteristics of the processed materials and the construction of the cutting tools (G6.1; G8.5).

2.5. The influence of the cutting tool and its frequency of rotation on the noise load of the operator of a shaper with a spindle at a low position has been assessed (G6.1; G8.6).

2.6. The influence of the feed rate, the frequency of rotation of the cutting tool and the thickness of the removed layer on the level of noise emission in longitudinal flat cutting of beech wood (*Fagus Sylvatica* L.) has been determined (B3.1; G8.7).

2.7. The change in the vibration intensity of a shaper with a spindle at a low position has been determined depending on the cutting speeds and the thickness of the removed layer, as well as the influence of the cutting tool on the overall dynamic behaviour of the machine (G8.10; G8.15).

2.8. Assessments have been made of the sound-absorbing characteristics of Scots pine wood (*Pinus Sylvestris* L.) which have an impact on the level of sound pressure generated during their processing by cutting and on the acoustic parameters of the rooms in which the wood of this tree species is used in the interior (G7.8; G8.18).

2.9. The level of noise emission at the operator's workplace of the block saw and dividing saw during operation of the machines with and without cutting has been determined. The graphical dependences are a prerequisite for calculating the equivalent sound pressure level at the workplaces of these machines (B3.1; G8.22).

2.10. Assessments have been made of the influence of the cutting and feeding speed, the thickness of the removed layer and the number of belts in the gear on the dynamic behavior of a universal woodworking shaper on the basis of the root mean square value of the vibration speed measured for the bearing bodies of the spindle (G7.9; G8.3).

2.11. The change of the power and the cutting force in the longitudinal flat cutting of beech wood (*Fagus Sylvatica* L.) and Scots pine wood (*Pinus Sylvestris* L.) has been determined depending on the cutting speed, the feed rate and the area of the removed layer (G8.16; G8.17).

2.12. The indicator of efficiency and effective power in sharpening flat knives with abrasive tools made of polycrystalline diamond (forward and reverse) has been determined and the specific consumption of abrasive material PCD has been identified (G7.5; G8.23).

2.13. Dynamic models have been developed for studying the accompanying, non-fading and fading spatial vibrations of a woodworking cutting machine and its spindle (G8.8; G8.12; G8.13).

3. Applied contributions:

3.1. The influence of the number of V-belts on the operation of the cutting mechanism of a shaper with a spindle at a low position both at idle and operational mode has been determined (G8.14).

3.2. The frequencies and types of the free spatial vibrations of a shaper, its spindle and the rotor of electric motor have been identified (G8.9).

3.3. The free fading spatial vibrations of a shaper with a spindle at a low position, the rotor of electric motor and its spindle have been identified (G8.24).

3.4. The accompanying spatial vibrations as a result of imbalance of the rotor of electric motor of a shaper with a spindle at a low position have been identified (G7.6).

5. Assessment of the applicant's contribution

I agree that most of the results achieved in applicant's research activities in the materials submitted for the competition are individual work of the candidate. This is confirmed by the fact that seven of the publications are without a co-author, and in 14 of co-authored publications

he is the first author. He has actively participates in 13 scientific, educational, applied and infrastructure projects, some of which he has managed.

The data listed convincingly shows that the scientific, scientific-applied and applied contributions indicated in point 4 are mainly individual work of the candidate or have been achieved under his guidance and with his active participation.

6. Critical remarks

In the publications submitted for the competition I did not find any omissions of fundamental nature such as incorrect approaches, methods, incorrect summaries and conclusions of the research results. All materials submitted for participation in the competition are well-structured and presented, each publication has an introduction, main content of the work, conclusions, references. However, a few weaknesses of the contributions can be pointed out as critical remarks such as: submitted research contributions that are not in the scientific field of the competition (2.14 and 3.5); and a not very accurate listing of some contributions in the respective group.

I recommend the candidate to continue to work as hard and effectively in the field of education and science.

7. Personal impressions

I have known Chief Assistant Professor Dr. Pavlin Vitchev since he was an undergraduate and in the course of years of professional communication with him. He is well prepared professionally with a desire to acquire new knowledge and skills. He also improved his qualification participating in specialization courses abroad (Salzburg, Austria and Zvolen, Slovakia) and in the training courses in Bulgaria such as *Methodology of Academic Training, Use of Modern Teaching Methods, Communication Skills and Teamwork, Environmental Protection, Fundamentals of Information Technologies and Development of Curricula, Plans and Programs Related to the Credit Transfer Accumulation System*.

Chief Assistant Professor Dr. Pavlin Vitchev is a polite, sociable staff member possessing integrity. He participates regularly in scientific forums at home and abroad. In his work he shows creativity and seeks to apply modern methods and tools for quality education of students. He has proved that he can solve research problems on his own, and he is a useful and active team member in collaborations.

8. Conclusion

The contemporary importance and positive assessment of the good pedagogical activity, active participation in research give grounds to claim that the requirements of the Regulations for Development of the Academic Staff at the University of Forestry are met.

In connection with the above, I propose that Chief Assistant Professor Dr. Pavlin Biserov Vitchev be elected as „Associate Professor“ in the discipline “Wood cutting and cutting tools” in the Professional field 6.5 Forestry, scientific specialty “Technology, mechanization and automation of the woodworking and furniture industry”.

Signature of the reviewer:



Review submitted to: