

## OPINION

On the materials submitted for participation in a competition for „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 tools“

In the competition for professor, announced in the State Gazette, issue 37/07.05.2019 and on the website of the University of Forestry with the code WWW - P - 0419 - 06 for the needs of the Department of „Woodworking machines“, at the Faculty of Forest Industry, as a candidate participate Assoc. Prof. Zhivko Bonev Gochev Ph.D., Faculty of Forestry, Department of „Woodworking machines“.

**The opinion is prepared by:** Professor Assia Petrova Tosheva – Marinova, Ph.D. in a Professional Field 5.13 General engineering, scientific specialty „Technology, mechanization and automation of the woodworking and furniture industry“, from University of Forestry – Sofia, Faculty of Forest Industry

### 1. Brief biographical data of the candidate

The candidate Assoc. Prof. Dr. Zhivko Bonev Gochev was born on 25.03.1960. In 1985 he graduated with a Master's Degree in Mechanical Wood Technology from the Higher Institute of Forestry (now University of Forestry), Sofia. After graduating from 1985 to 1987, he worked as a technology engineer at a furniture manufacturing plant. In the period 1987 - 1990 he was a full-time Ph.D. student at the in the Department of „Mechanization and Automation of woodworking and furniture industry“, Faculty of „Forest industry“. In 1996 he defended his dissertation on „Study on the Process of Laser cutting of Particleboard Furniture Details“ and was awarded the educational and scientific degree „Doctor“ in the specialty „Technology, mechanization and automation of the woodworking and furniture industry“. In 1991-1992, he was a research engineer at the Research Department of University of Forestry, and in the period 1992-1994, he worked as a technology engineer in a plant for the production of woodworking machines. Since January 1995 he is Head of the Laser Technology Laboratory at the University of Forestry. Since September 1991 he has been a part-time assistant, and since 1996 - chief assistant at the Department of „Woodworking Machines“. In March 2005 he was elected as Associate Professor. Since November 2007 he has been the Head of the Department of Woodworking Machines; in the period February 2013 - March 2016 he has been Deputy Dean of Education at the Faculty of Forest Industry, and since March 2016 has been elected Dean of the Faculty of Forest Industry. Assoc. Prof. Gochev has participated in vocational training in Japan (1997), Sweden (1998) and Finland (2001).

### 2. Compliance of the submitted documents and materials of the applicant according to the Rules of the Development of academic staff at the University of Forestry.

The submitted documents and materials of the candidate Assoc. Prof. Zhivko Bonev Gochev, Ph.D. fully correspond to the Rules of the Development of academic staff at the University of Forestry.

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

Assoc. Prof. Zhivko Gochev is the titular of the following disciplines after his habilitation in 2005:

- „Wood cutting and cutting tools“ - specialty „Technology of wood and furniture“, Bachelor's Degree Program, full-time and part-time training, with a 60 hours and 30 hours lectures (2005 - 2018);

- „Production Practice“ – specialty „Technology of wood and furniture“, Bachelor's Degree Program, full-time (30 hours exercises) and part-time (15 hours) forms of training (from 2018);

- „Lasers application in woodworking and furniture industry“ – specialty „Technology of wood and furniture“, Master's degree program, full-time (30 hours lectures and 30 hours exercises) and part-time (15 hours lectures and 15 hours exercises) form of training, (2005 - 2018);

- „CNC machines, tools and technologies“ – specialty „Technology of wood and furniture“, Master's degree program, full-time (45 hours lectures and 45 hours exercises) and part-time (22 hours lectures and 23 hours exercises) form of training (2010 – 2018).

Assoc. Prof. Gochev has prepared curricula for the disciplines he has led, which were updated in 2017. From the attached report on completed lecturing and the outside lecturing for the last 5 years, it can be seen that he has always exceeded the academic curriculum provided by the Rules of the University of Forestry.

He was the scientific supervisor of the one Ph.D. student Eng. Valentin Atanasov Atanasov, successfully graduates on September 9, 2014, his Ph.D. thesis on the topic „Research on the performance indicators of portable band sawmills“.

Assoc. Prof. Gochev has actively participated in 5 educational projects at the University of Forestry.

The candidate's educational and pedagogical activities should be emphasized his active participation and assumed responsibilities as Dean of the Faculty of Forest Industry in accreditation of the two specialties at the faculty: „Engineering Design (Interior and Furniture Design)“ in the professional field 5.13 „General Engineering“ and „Technology of wood and furniture“ in the professional field 6.5 „Forestry“; the initial accreditation of the scientific specialty „Ergonomics and industrial design“ and the program accreditation of the other three scientific specialties in the professional field 5.13 „General Engineering“. Assoc. Prof. Gochev participated in a committee on institutional accreditation procedure of the University of Forestry. He is actively taking part in the State Examination Committees for the Bachelor's and Master's degree of the specialty „Technology of wood and furniture“.

Assoc. Prof. Zhivko Gotchev was the head of an infrastructure project for repair works and partial renovation of the Research and Study Laboratory (№ 12, Building A) at the Department of „Woodworking machines“.

The above facts and the attached evidence documents show that the candidate Assoc. Prof. Gochev exceeded the criteria of the requirements for occupying academic position „professor“ at the University of Forestry.

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

General description of the materials presented:

The candidate Assoc. Prof. Zhivko Bonev Gochev participated in the competition with a total of 100 scientific papers after his election as Associate Professor. They are distributed as follows:

- Monographs – 1 piece [1]. The monograph is a reviewed scientific book with ISBN;
- Textbooks – 1 piece [4]. The textbook is reviewed with ISBN;
- Learning materials – 1 piece [3]. A complete lecture course published in the Blackboard system at the University of Forestry;
- Training materials – 1 piece. [2]. Handbook of the Woodworking and Furniture Industry Entrepreneur with ISBN co-authored by 11 other authors;
- Books – 1 piece. [5]. Co-authored by another author;
- Publications – 95 units, distributed as follows:
  - Publications in foreign referenced and indexed scientific journals, series and conference proceedings - Web of Science and SCOPUS – 13 items [6 ÷ 18];
  - Publications in foreign scientific journals, series and conference proceedings conference proceedings, referenced and indexed outside the Web of Science and SCOPUS databases – 8 items [19 ÷ 26];
  - Publications in Bulgarian scientific journals, series and conference proceedings, referenced and indexed outside the Web of Science and SCOPUS databases – 10 items [27 ÷ 36];
  - Publications in unrefined scientific journals and series – 27 items, of which national – 19 [37 ÷ 55] and international – 8 [56 ÷ 63];
  - Publications in proceedings of scientific forums – 37 items, of which national – 11 [64 ÷ 74] and international – 26 [75 ÷ 100];
- Projects – 21 pcs. [101 ÷ 121].

Language in which the applicant's scientific papers are published:

• in Bulgarian – 17; • in English – 74; • in Serbian – 3; • in Macedonian language – 1.

Number of Co-authors:

• Independent – 15; • with one co-author – 16; • with two co-authors – 23; • with three or more co-authors – 41 pcs.

#### **4.1 Participation in scientific, scientific-applied and educational projects**

The candidate Assoc. Prof. Zhivko Gochev has applied a list of 21 scientific, scientific-applied and educational projects:

- Research projects funded by the University of Forestry under Ordinance № 9 – 4 pcs. [101 ÷ 104];
- National research projects – 1 pc. [105];
- International scientific-applied projects – 3 pcs. [106 ÷ 108];
- National educational projects – 5 pcs. [109 ÷ 113];
- Infrastructure projects funded by the University of Forestry under Ordinance № 9 – 1 pc. [114];
- Projects funded by the Scientific Research Fund to support international scientific forums – 1 pc. [115];

- Projects funded by the Training and Experimental Forest Ranges of the University of Forestry – 6 pcs. [116 ÷ 121].

In 13 of them he is the head of the scientific team, and in another 8 – member of the team.

#### **4.2 Characterization of published scientific results**

The candidate Assoc. Prof. Gochev participates in the competition with a total of 100 scientific papers and 21 scientific, scientific-applied and educational projects after his election as associate professor.

The published scientific results are directly related to the two components of the discipline of the announced competition for Professor „Wood cutting and cutting tools“: „Wood cutting and wood-based materials“ and „Cutting tools“, as well as with the „CNC machines, tools and technologies“. The published results have a scientific, scientific-applied and applied character and are related to the clarification of theoretical problems, analysis of the results obtained, conclusions and recommendations for practical activities.

In a number of publications submitted by the candidate, scientific-applied and applied results have been published which are not directly related to the two constituent strands of the discipline of the professor competition, such as the complex use of wood biomass for energy, etc.

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

In his documents and materials the candidate Assoc. Prof. Zhivko Gochev applies a list of total 60 known citations about his papers by other authors and copies for evidence.

**According to the type of citations, they are distributed as follows:**

- In referenced and indexed editions - Web of Science and Scopus – 13 citations: including Impact Factors (IF) journals – 7 and Impact rank journals (SJRs) – 3;
- In referenced editions outside the Web of Science and Scopus databases – 8 citations;
- In unrefined publications – 31 citations;
- In teaching aids, monographs, dissertations, etc. – 8 citations.

The total number of the cited publications of the candidate is 20. From the papers published after habilitation for „associate professor“, 30 citations were found of 18 publications.

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

The information provided by the candidate Assoc. Prof. Gochev is thematically arranged and the relevant contributions are described in detail in the following directions:

- I. Wood cutting and wood-based materials
- II. Cutting tools
- III. CNC machines, tools and technologies
- IV. Complex use of wood biomass for energy
- V. Scientific-applied, educational, infrastructure and projects to support international scientific forums

The most important scientific, scientific-applied and applied contributions in the papers proposed for review by Assoc. Prof. Gochev are as follows:

### **Scientific contributions**

1. A methodology has been developed to study the working capacity of wide and narrow band saw blades with part-set, swage-set and stellite tipped teeth, which allows the development of optimization modes according to a specific criterion [4, 5, 7, 46, 47, 53, 64, 102, 104, and 105].
2. A mechano-mathematical model to study the free undamped space vibrations of a woodworking shaper and its spindle has been developed and numerical solutions and graphs were obtained [35, 89, 94, 100, and 104].
3. A methodology for the power-energy parameters of the process of a longitudinal plane and profile milling of solid wood of a woodworking shaper machine with a lower location of the spindle has been developed using different types of milling tools. [4, 18, 26, 34, 48, 49, 61, 62, 73, 104, 105].
4. A methodology was developed and experimental studies were conducted on electric arc welding of a wide band saw blades with a melting electrode by analyzing the influence of the welding mode on the geometrical characteristics and the quality of the weld was analysed [38, 101].
5. An adequate mechanic-mathematical model has been proposed to study the free undamped vibrations of a circular saw with TCT tipped teeth on the basis of which simulation studies were conducted [84,85].

### **Scientific-applied contributions**

1. Experimental studies have clarified the problems associated with the working capacity and wear resistance of the part-set, swage-set and stellite tipped teeth of the wide and narrow band saw blades for wood logs sawing. [4, 5, 7, 46, 47, 53, 64, 102, 105].
2. A numerical investigation of the natural frequencies and mode shapes of the free spatial oscillations for a specific type of machine and its cutting mechanism have been done as well as the natural frequencies required to define resonance modes [13, 20, 35, 89, 94, 100, 104 ].
3. The main factors that influence the welding process of the band saw blades, related to the parameters of the welding mode, the type of welding material and the mode of heat treatment in the welding zone have been identified [1, 37, 38, 101].
4. A system of indicators for selection of CNC machine according to its kinematic features and technological capabilities, selection of cutting tools, schemes and cutting modes, quality and precision of the machined surfaces is developed [8, 77, 103].
5. The main characteristics of woody biomass according to its energy indicators, origin, sources, and methods of its use are studied [12, 43, 44, 45, 81, and 108].
6. The regulatory basis for the use of the biomass as a raw material for energy production has been studied, the main characteristics of the energy chips, the moisture content and calorific value of the wood chips, the role of the bark, the impurity percentage, the delivery, the acceptance, the quality testing and the storage of dendromass [28, 50, 51, 79, 80, 83, 108].

### **Applied contributions**

1. Technological modes and instructions have been developed for the effective use of wide band saw blades with part-set, swage-set and stellite tipped teeth, according to the specific production conditions [5, 7, 46, 47, 53, 64, 102, and 105].
2. For the needs of the educational process of students in the specialty „Technology of wood and furniture“, samples and photo material have been prepared showing the sequence of the technological process of selection, preparation of the teeth and modes for effective cutting of soft and hardwood with a band saw blades [5, 7, 46, 47, 53, 64, 102, 105].
3. The main mistakes and defects, which are obtained during the satellite depositing on the wide band saw blades teeth in the Training and Experimental Forest Range-Yundola, are analysed, and some results of experimental studies with this type of teeth are presented [1, 4, 66, 102].
4. Recommended regimes are developed for the welding of a band saw blades for the Training and Experimental Forest Range-Yundola and for all interested stakeholders [1, 37, 38, 101].
5. It has been established that in our country there are favorable conditions for the creation of energy poplar plantations, which, under suitable conditions, groundwater and measures to promote growth, can produce a significant annual yield of dry dendromass [28, 50, 51, 79, 80, 83, 108].

### **5. Assessment of the applicant's personal contribution**

Assoc. Prof. Gochev participates in the competition for a professor with 15 independent publications, 16 with one co-author, 23 with two co-authors and 41 - with three or more co-authors. Co-publishing papers do not contain splitting protocols. In 16 publications with co-authors, he is the lead author. In 13 out of 21 presented scientific-research, scientific-applied and educational projects he is the head of the scientific team.

After acquaintance with all the papers with which Assoc. Prof. Gochev applied in the competition for a professor, I am convinced that they, as well as the contributions contained in them, are his personal work or have been achieved with his substantial participation in the development of research problems.

### **6. Critical remarks**

To the submitted research papers of the candidate can be noted some critical remarks that do not diminish the results achieved by him:

- In the publications' classification presented by the candidate, the number of independent publications is 16, instead of 15, and those with 3 and more co-authors – 40 instead of 41.

- Some minor inaccuracies were noted when comparing the candidate's Scientific and Publication Report (Annex 2) with the List of Publications:

- In indicator G7, publication 7.12 is with 6 co-authors and not 5 as given, i.e. the points to be counted are 5 and not 6, which reduces insignificantly the total score of G7 – 197 instead of 198;

- In indicator G8, publication 8.24 is given with 3 co-authors and in the List of Publications it is № 28 – with 4 co-authors, which reduces its contribution from 3.33 to 2.5 points;

- In indicator G8, publication 8.54 is given with 4 co-authors, and for determining the points the divisor is 3, which reduces its contribution from 3.33 to 2.5 points; for publication 8.76 in the column of co-authors there are 4, but 2 points for 5 co-authors are correctly recorded.

- I think that the list of contributions is too detailed and could be presented in a more synthesized way, highlighting the novelty of scientific contributions in the area studied and more clearly distinguishing between scientific and scientific-applied contributions. Some of the contributions can be united by appropriate signs.

## **7. Personal impressions**

I know Associate Professor Gochev since joining the University of Forestry. He is a long-term head of the Laser Technology Laboratory at the University of Forestry, Head of the Department of „Woodworking Machines“, Vice Dean of the academic activity, and since March 2016 is Dean of the Faculty of Forest Industry. In all these years, he has demonstrated his ability to lead colleagues' teamwork, to organize scientific seminars and conferences with international participation. He has worked in different types of research teams on national and international projects, has very good communication skills in working under pressure and meeting deadlines. Very respected by colleagues and students at the University of Forestry, as well as by colleagues in branch organizations. Acknowledgment of this is the 4 thankful letters received for beneficial cooperation from 2 enterprises in Bulgaria (in Smolyan and Haskovo) and related faculties at universities abroad (Zvolen, Slovakia and Skopje, Northern Macedonia). He is an expert at Technical Committee TC-52 „Safety of Machinery and Equipment“ and since 2010 is a licensed machine and equipment estimator. He speaks English and Russian at a high level, with an intermediate level of German and a basic level – Slovak and Serbian. He has a fluent command of various software products to automate the design and research process, which, along with his in-depth scientific knowledge in the field of wood cutting and cutting tools, CNC machines and technologies, laser technologies in the wood and furniture industry, make him a highly educated and established university lecturer.

## **8. Conclusion**

From the presented report on scientific and publishing activity (Annex 2) of Assoc. Prof. Zhivko Gochev, it can be seen that all the criteria for occupying the academic position "professor" in professional field 6.5. Forestry is significantly exceeded. The total number of his points is about 1200 at the minimum national requirement for the academic rank Professor 550 (Annex 1.4). The educational and pedagogical activities of the applicant are in accordance with the requirements of the University of Forestry.

**In connection with the above, I propose that Assoc. Prof. Zhivko Bonev Gochev, Ph.D., to be elected as a „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“.**

Opinion prepared by: ...

/Prof. Assia Marinova Ph.D./

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