REVIEW

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 „Furniture Technology"

In the competition for professor, published in the State Gazette, issue 102 / 07.12.2021 and on the site of the University of Forestry with the code WWI-P-1121-74 for the needs of the Department of „Furniture Production" at the Faculty of Forest Industry, as a candidate participate assoc. prof. Dimitar Hristov Angelski, Ph.D., Faculty of Forestry, Department of "Furniture Production"

Reviewer: Veselin Stamenov Brezin, Ph.D., Professor in a Professional Field 6.5 Forestry, scientific specialty „Technology, mechanization and automation of the woodworking and furniture industry", from University of Forestry / retired

1. Brief biographical data for the candidate

Assoc. prof. Dimitar Hristov Angelski, Ph.D. was born on March 25th, 1975 in the city of Sofia. He entered the University of Forestry in 1994 as a student majoring in "Mechanical Wood Technology". From 2003 to 2007 he was a part-time Ph.D student in the Department of Furniture Production under the scientific supervision of Prof. Dr. Andrey Kavalov. In 2010 he defended his dissertation on "Research on the processes of plasticization and bending of solid wood parts". Since February 2001 he has been appointed a full-time assistant in the disciplines "Furniture Technology" and "Workshop on Furniture Production". He has successively held the academic positions of Senior Assistant and Chief Assistant, lecturing and conducting exercises in the disciplines "Furniture Technology", "Furniture Manufacturing" and "Technologies of decorative maintaining of furniture". In 2015 he was appointed associate professor at the Department of Furniture Production, lecturing on the disciplines "Furniture Technology", "Furniture Production", " Technologies of decorative maintaining of furniture ", "Technological Design of Furniture Companies". Conducts classes with students from the Faculty of Forestry, Bachelor's and Master's degrees, as well as with students from the Faculty of Business Administration, Bachelor's degree. He has accumulated experience in managing teams and projects, as a leader and participant in research and educational projects. He speaks English and Russian. He has a total work experience of about 21 years at University of Forestry. Since 2016 and until now he is vice dean of the Faculty of Forest Industry.

2. Correspondence 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. Dimitar Hristov Angelski, Ph.D., are in accordance with the requirements of Article 65, paragraph 1 of the Rules for Development of the Academic Staff at the University of Forestry, as well as with the National Requirements according to Article 26, paragraphs 2, 3 and 6.

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

The participant in the competition, Assoc. prof. Dimitar Hristov Angelski, Ph.D., entered the University of Forestry initially as a part-time assistant in the discipline "Furniture Technology". From 2001 to 2005 he was an assistant and conducted classes in the following disciplines: "Furniture Technology" and "Workshop on Furniture Production ".

From 2005 to 2008 he was a senior assistant and was additionally assigned to perform classes on "Design of park forestry facilities made of wood."

He was hired as a part-time lecturer at the National Academy of Arts in the discipline "Engineering and Technology" over the period from 2006 to 2009.

In 2015 he was appointed as associate professor and lectured in the disciplines "Furniture Technology", "Furniture Production", " Technologies of decorative maintaining of furniture" and "Technological design of a furniture company".

He has been the scientific supervisor of 1 doctoral student and 53 graduates.

For his teaching and research work, Assoc. Prof. Dimitar Angelski, Ph.D., received high assessment from both students and colleagues. Highly competent as a teacher, intelligent and direct, thorough and consistent, he has established himself as one of the leading specialists in the field of furniture production.

I am convinced that the creative achievements and the presented materials in the competition scope for the academic position "Professor" at the Department of „Furniture Production" are entirely personal work of the candidate. My own assessment of Assoc. Prof. Dimitar Angelski Ph.D. as a lecturer, researcher and professional is very high. Extremely modest and hardworking, serious and competent, he has a very high authority in University of Forestry and even outside.

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

General description of the presented materials

Candidate Assoc. Prof. Dimitar Angelski, Ph.D. participated in the competition with:
- Textbooks – 1 number;
- Learning materials – 5 numbers;
- Publications - 50 numbers;
- Projects - 9 numbers.

4.1 Participation in scientific, scientific-applied and educational projects

Assoc. Prof. Dimitar Angelski, Ph.D. has participated in the implementation of 9 projects, distributed as follows:

- Scientific research projects funded by the University of Forestry - 5 numbers;

- Scientific and educational projects - 4 numbers;

- Scientific and applied projects, financed by the Training and Experimental Forest Ranges of the University of Forestry – 8 numbers.

4.2 Characterization of published scientific results

The publications can be classified as follows:

By type:

- Publications in scientific journals - 26 numbers;
- Publications in proceedings of scientific - 14 numbers;

By significance

- Articles in journals with impact factor (IF) - 1 number;
- Articles in journals with impact rang (SJR) - 10 numbers;
- Articles in journals referenced and indexed in Web of Science and SCOPUS - 9 numbers;
- Papers in proceedings of international scientific forums referenced and indexed in Web of Science and SCOPUS - 8 numbers;
- Articles in journals without Impact Factor - 11 numbers;
- Papers in proceedings of international scientific forums - 11 numbers;

Place of publication:

- Articles in Bulgarian and foreign journals referred in Web of Science and SCOPUS - a total of 20 numbers;
- Articles in Bulgarian and foreign journals refereed outside the Web of Science and SCOPUS - 11 numbers;
- Papers in proceedings of international scientific forums – a total of 19 numbers.

Publishing language:

- In Bulgarian - 7 numbers;
- In a foreign language - 43 numbers;

Number of co-authors:

- Individual publications - 6 numbers;
- With one co-author - 9 numbers;
- With two co-authors - 13 numbers;
- With three or more co-authors - 22 numbers.

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

- Total - 25 citations.

By type of citations:

- In reference journals and proceedings of scientific forums - 16 citations;
- In teaching aids, monographs, dissertations, etc. - 9 citations.

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

The scientific works presented by Assoc. Prof. Dimitar Angelski, Ph.D. for participation in the competition are a result of the use of modern methods for research and analysis of technological processes and phenomena in the field of furniture production. They are related to clarification of theoretical issues, analysis of obtained results, conclusions and recommendations for practical work. They can be grouped in the following directions:

- PLASTICIZATION AND BENDING OF FURNITURE ELEMENTS;

- DECORATIVE LAMINATION OF FURNITURE SURFACES;

- SMOOTHING OF WOODEN SURFACES WITH THE PURPOSE OF PREPARATION FOR FORMATION OF FILM PROTECTIVE DECORATIVE COATINGS;

- APPLICATION OF VARNISH-PAINTING MATERIALS ON FURNITURE SURFACES.

The main contributions to the overall scientific and scientific-teaching activity of the candidate are as follows:

SCIENTIFIC CONTRIBUTION

One-dimensional (1D) linear and nonlinear models for calculating the non-stationary temperature distribution in the thickness of solid wood parts subjected to one-sided heating before plasticization were compiled and solved by a partial differential equation of thermal conductivity and the corresponding initial and boundary conditions. (publications № 7.1 and № 8.3);

- A methodology for mathematical modeling and research of two interrelated problems has been developed: temperature distribution along the thickness of the flat wooden parts subjected to unilateral heating before bending and energy consumption in this process. By using the numerical solutions of the linear mathematical model of the process of one-sided heating of the details (publications № № 7.2, 7.4, 7.6, 8.8);

- Studies have been conducted on the influence of the flexibility of the working lapping body over the smoothing quality of veneered furniture panels, with an original own installation used. It has been proven that uniformity is achieved if using friction devices that are with flexible support base and can provide at least double pressure impact with a linearly distributed load size $q \geq 6$ kN/m. (publications № 8.11 and 8.12);

- A methodology for calculation and study of two interrelated parameters has been developed: 1D non-stationary temperature distribution when flat wooden furniture elements subjected to unilateral convective heating before varnishing and change of their average mass thermal conductivity. For this purpose, numerical solutions of a linear mathematical model of the process of one-sided convective heating of parts are used, including the differential equation of thermal conductivity in one-dimensional variant under the respective initial and boundary conditions of this process. (publications № № 7.3, 7.5, 7.12, 8.5, 8.6);

- A mathematical model and numerical approach for calculating the specific energy consumption for convective heating of flat furniture elements before their varnishing have been developed by integrating the solutions of a nonlinear model for calculating the nonstationary 1D temperature distribution along the thickness of furniture elements subjected to unilaterally convective heating. (publications № 7.8 and 8.7)

SCIENTIFIC-APPLIED CONTRIBUTIONS

- By applied one-dimensional (1D) linear and nonlinear models of the process of one-sided heating of wooden parts before bending. It has been established that the non-stationary change of the temperature in the separate points of the thickness of spruce and oak details occurs in increasing, two exponents passing into each other. The first exponents start from values equal to the initial temperature of the wood, and the second asymptotically approaches the maximum

values on the surface of the details. Maximum values are reached when a stationary temperature distribution is established along the thickness of the parts. (publications № № 7.1, 8.3, 8.9);

- Using a 1D nonlinear mathematical model, the change in temperature field along the thickness of wooden parts subjected to unilateral heating before their subsequent bending is calculated and the change in their average mass coefficients of thermal conductivity and thermal conductivity coefficients on their unheated surface is determined. (publication № 8.9);

- An approach has been developed to calculate the heat flux required for heating flat wood parts by unilateral heating in order to plasticize them, based on numerical integration and differentiation of linear model solutions to calculate the non-stationary 1D temperature distribution of part thickness. The non-stationary change of the specific heat flux required for heating flat spruce parts is graphically presented. (publication № 8.4);

- Energy consumption has been determined to cover the heat emission of spruce and oak parts with an initial temperature of 20° C, water content of 15% and different thicknesses during their one-sided heating at different temperatures of heating metal strip. (publications № № 7.2, 7.4, 7.6, 8.8);

- A universal method for studying the formability of curvilinear furniture parts has been proposed, a regime for making curvilinear furniture details from glued HDF parts on thermovacuum membrane press has been drawn up. (publication № 8.15);

- The dimensional stability of curvilinear furniture units, made by gluing MDF and internal filling of slats, using three types of adhesives, has been determined. (publication № 8.18);

- A regime for lamination of bent furniture elements with PVC foil and polyurethane glue has been developed. (publication № 8.16);

- The influence of the grit size of sandpaper during sanding of the surface to be coated over the adhesive strength of adhesive joints between HDF and PVC foil has been established (publication № 8.17);

- A lapping device with three constructions of working lapping bodies has been developed and applied, providing different formation of the supporting base (rigid, semi-elastic and flexible) of the lapping element. The device creates the possibility to change the size of the linearly distributed pressure load. (publications № 8.11 and 8.12);

- The complex influence of the linearly distributed pressure load and the number of frictions on the uniformity of the friction and the arithmetic mean of the heights of the micro-roughnesses by friction with working bodies on a "solid" and "semi-elastic" basis is determined. (publication № 8.12);

- It has been established that the hardness of the veneer does not affect the quality of the smoothed by friction veneered furniture panels. (publication № 8.11);

- The one-dimensional nonlinear mathematical model is used to calculate the one-dimensional non-stationary distribution of the temperature and the average mass thermal conductivity of heated furniture elements before their varnishing. (publications № № 7.3, 7.5, 7.8, 7.12, 8.5, 8.6, 8.7);

- The complex influence of the feed rate and the amount of varnish on the degree of UV hardening of polyurethane coatings during pass-through application and adhesion strength was established by a model for a two-factor experiment. It was found that the feed rate has the most significant impact on the adhesion strength and the degree of hardening of polyurethane coatings applied to veneered MDF. It has been determined that at a feed rate in the range of 1 to 3 m / min, significant radiation exposure is realized, which leads to low adhesion strength of the coatings. (publications № 8.18 and 8.20);

- Three-factor regression models have been developed, reflecting characteristic successive phases of the film formation of the lacquer system, and the primary influence of the number of applied layers on the arithmetic deviation of the lacquer coating profile has been proved. (publication № 8.13)

APPLIED CONTRIBUTIONS

- The influence of the type of adhesive on the adhesion strength of adhesive compounds during positional veneering of particle boards with oak veneer has been established. (publication № 8.14);

- Nomograms have been drawn up to determine the roughness and uniformity of the smoothed by friction surfaces during lapping via working bodies with a "rigid" and "semi-elastic" base by changing the regime parameters, linearly distributed compressive load and number of impacts. (publication 8.12); (publication 8.12);

- Nomograms have been compiled to determine the adhesion strength and the phase of UV curing when changing the regime parameters feed rate and the amount of varnish during the pass-through application of polyurethane coatings. (publications № 8.18 and 8.20);

- It was found that ultraviolet radiation has the most adverse effect on the resistance of protective and decorative coatings applied to wood exposed to the weather. Long-lasting protective effect of the coatings is achieved only in case of indirect effects of solar radiation on the wood. (publication № 8.10);

- The adhesive strength of different types of paint coatings applied to spruce and oak wood has been determined. It has been found that paints developed for the formation of coatings on silicate surfaces form coatings on wood with normative adhesion strength and can also be used for decorating wood construction products. (publication № 8.2);

- Nomograms have been compiled to determine the arithmetic mean deviation of the profile of acrylic lacquer coating by changing the grain size of the sandpaper, the amount of primer and the number of coats applied. (publication № 8.13);

- From the data and observations conducted on a nano-based lacquer system, it was found that it forms a coating with higher adhesion strength and a surface with a larger arithmetic mean deviation of the profile compared to similar conventional lacquer systems. (publications № 8.21 and 8.22)

- The water permeability of nano-based lacquer coatings applied to larch wood (*Larix spp.*), Meranti (*Shorea spp.*) And red oak (*Quercus rubra*) was determined. It was found that the adsorption of water from the nano-lacquer coating applied to glass is $12 \pm 5\%$ g / m^2 for 72 hours, and the desorption lasts 2 hours at a relative humidity of 60% and a temperature of 20 ° C. (publication № 8.21).

5. Assessment of the applicant's personal candidate

The materials submitted by the candidate for participation in a competition for the academic position "Professor" at the Department of "Furniture Production" are undoubtedly the work of assoc. prof. Dimitar Angelski, Ph.D. The methodological participation of the candidate is evident in the co-author's publications. His excellent professional training gives him the opportunity to give lectures at the University of Applied Sciences "Rosenheim" -Germany and the Technical Educational Institute in Larissa-Greece, where they have been looking for his expertise. He has participated in the preparation of 5 curricula. He was involved as a member of 10 scientific juries, as well as a member of 8 scientific and organizational committees for scientific forums.

Assoc. Prof. Dr. Dimitar Angelski is a well-established lecturer and researcher who has a significant contribution and potential in the research and development of scientific tasks related to the use of innovative and advanced methods related to the production of furniture.

Well-mannered and balanced, with high knowledge in the field of taught disciplines. This makes him highly useful and in demand not only as a teacher, but also as a consultant and expert in a number of Bulgarian and international companies.

6. Critical remarks

I have no serious and significant critical remarks to the candidate Assoc. Prof. Dr. Dimitar Angelski, as the materials presented for the competition have been prepared and executed precisely and are in accordance with the requirements of Rules for the Development of Academic Staff in University of Forestry.

Appreciating the overall scientific and teaching activity of the candidate, I consider it necessary to make a few well-intentioned recommendations:

1. To increase his publishing activity in order to popularize his scientific achievements.

2. Regardless of the fact that the Law allows for a monograph to be considered 10 referenced publications, I strongly recommend him to systematize his scientific works in a monograph.

3. I recommend the candidate to be more active in attracting more students, both for graduates and for participation in the development of scientific and applied research projects.

7. Personal impressions

I know Assoc. Prof. Dr. Dimitar Angelski since his student years. I was very impressed by his diligence, modesty and activity in lectures and exercises. As an established researcher he showed exceptional diligence, consistency, serious attitude and perseverance and opportunities for successful implementation of all his endeavors as a student, and later as a lecturer and vice dean of the Faculty of Forestry. Recognition for his professional knowledge, skills and competencies is his inclusion in scientific and organizational committees at prominent national and international forums and conferences. He regularly participates in the preparation of scientific conferences of the Faculty of Forestry at University of Forestry.

Successfully presented at a number of international forums organized in Greece, Slovakia, Northern Macedonia, Romania, Croatia, Poland, Bosnia and Herzegovina, Hungary, Germany, Turkey, Austria.

His open character, in-depth knowledge and diligence gave him the opportunity to be defined as a promising and competent young scientist, appreciated by his colleagues and by the business.

8. Conclusion

In connection with the above, I propose that Assoc. Prof. Dr. Dimitar Hristov Angelski be elected as a „Professor" in the discipline „Furniture Technology" 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: