

OPINION

PD-08-111/19.10.2020

on the materials submitted for participation in a competition for the academic position (AP) "Associate Professor" in professional field 6.5 "Forestry", scientific specialty "Forest melioration, forest protection and special uses in forests", announced by the Institute of Forestry – Bulgarian Academy of Science (BAS) in State Gazette (SG) no. 56 / 23.06.2020

Candidate for participation in the competition: In the competition for AP "Associate Professor" documents have been submitted and only the candidate Chief Assistant Professor Svetozar Ivanov Madzhov, PhD, from the Institute of Forestry, Bulgarian Academy of Sciences, for the needs of the Forestry and Forest Resources Management Section

Opinion prepared by: Prof. Dr. Eng. Krassimira Gospodinova Georgieva,
Thracian University - Stara Zagora

1. Brief biographical data.

His higher education chief assistant. Dr. Eng. Svetozar Ivanov Madzhov received a master's degree at the University of Forestry in Sofia, with a professional qualification "engineer - forester".

From 02.2001 to 03.2004 he developed and defended his doctoral dissertation in the scientific specialty 02.01.32 "Machinery and equipment for forestry, logging, wood processing and furniture industry".

For the period 2004-2014 he held the positions of Chief Engineer, Sales Director, Sales Manager, Manager and others in various companies. Since 2014 he has been working at the Forest Institute of the Bulgarian Academy of Sciences as a Forestry Engineer, and since 2014 he has been elected Chief Assistant in the specialty: Forest Melioration, Forest Protection and Special Forest Uses.

At the same time, he is constantly improving his qualification through specializations and trainings at UNWE-Sofia, UACEG-Sofia, and others, evident also from the presented applications. He speaks English very well.

2. Compliance of the submitted documents and materials of the applicant with the minimum requirements, according to the Regulations for acquiring scientific degrees and holding academic positions at the Institute of Forestry - BAS.

The submitted materials for participation in the competition for the academic position "Associate Professor" comply with the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for its implementation and the Regulations for the conditions for obtaining scientific degrees and holding academic positions in Forest Institute - BAS. The scientometric indicators of the minimum required points by groups of indicators for AP "Associate Professor", ie. at 500 points, supporting documents for 1886 points were presented.

The authenticity of the submitted materials under the competition is supported by a declaration signed by the candidate for authenticity of the information.

3. General description of the submitted materials.

In the competition for AP "Associate Professor" Ch. assistant Dr. Eng. Madzhov participates with a total production of 48 works, as follows:

- Monograph "Maintenance and repair of forest roads", 2019;
- Scientific papers / publications in the announced scientific specialty - 47 issues, of which 11 are published in referenced and indexed in world-famous databases with scientific information, 36 in non-refereed journals with scientific review or in edited collective volumes, etc. The total Impact factor of the published materials IF is 0.911 and Impact rank SJR - 0.872.

Dr. Madzhov's personal participation in the presented works is as follows: 19 are independent, 19 are first, 13 are second, and the remaining 4 are third or in another sequence of co-authorship, as 30 pcs. are in Bulgarian, 7 pcs. in Russian and 8 pcs. in English. Therefore, I accept that the degree of participation in the

competition is high and equal to that of the other authors in the team.

The candidate correctly refers to research and results from foreign scientific papers, as I have no information and I have not found elements of plagiarism or incorrect reference.

4. Main directions in the research work of the candidate and the most important scientific and scientific-applied contributions.

The main scientific and scientific-applied contributions presented in the References in the published scientific papers are presented in the following directions: Reliability of the machines; Repair, maintenance and development of the forest road network; Technology and mechanization of forestry; Inventory Management and Utilization of forest resources, which I consider original, relevant and significant for the theory and practice in solving engineering problems and tasks.

4.1. Scientific contributions

- For the first time, the laws of resource distribution of Komatsu SAA4D104E-1 engine components have been established. The law of distribution of orders is established and the intensity of the flow of orders of spare parts of KOMATSU WB93R-5 backhoe loader is established, by months during the year of use, the 80% gamma - resource of engine elements is determined under known and unknown law of distribution and abbreviated (censored) samples.

- New mathematical models have been developed and tested to optimize the stock of spare parts at uniform and uneven consumption to maintain the performance of machines, and the influence of the basic parameters of the models on the change in total costs and changes in the volume of deliveries has been studied.

- Two models have been developed for optimal management of the stock of spare parts in case of uniform and uneven consumption, and a new model has been proposed for taking into account the influence of the irregularity of forestry production on the need for spare parts. In the second model, a very nomenclature model with a set limit for the value of stocks is considered.

- A model for technical maintenance of forest roads is proposed, based on the studied elements of the technical condition and their change in the process of operation and the indicators and characteristics of reliability are determined.

- A new mathematical model for studying the trend of cargo volume using a regression analysis apparatus is proposed. A stochastic model is proposed for optimizing the number of loaders in the warehouse of the logistics system depending on the volume of cargo, as the optimal number of loaders is between 3-4 pieces.

- and others.

4.2. Scientific and applied contributions

- The productivity of the chopping machine Bibeg-70, in the processing of waste from wood processing and furniture construction into energy chips, as well as the main factors that determine it, have been studied and substantiated. The change in the quality of the chips depending on the wear of the knives has been studied and determined. An optimal scheme of knife sharpening and new constructions of cutting knives are proposed, which are significantly cheaper than the original ones. A practical methodology for working with the machine is proposed.

- It has been proven that a significant reduction in costs in the service complex of machines can be achieved by optimizing the structure and parameters of the system for maintenance and repair of equipment with different methods and models, ensuring their efficient use.

- A systematization of the main operational coefficients of forest roads, necessary for determining the frequency and volume of repair and maintenance impacts on the road surface has been developed and on this basis a methodology for determining the terms between individual repairs, serviceability and service life of the road surface has been proposed.

- The types of road works during the different seasons of the year are substantiated and systematized depending on the weather conditions, temperatures and precipitation and it has been established that they differ greatly during the different seasons and require different types and amounts of restoration activities on forest roads. It has been established that the conditions are the most severe in the winter, which requires the application of a set of measures called winter road maintenance.

- A new complex approach and methodology for repair of various road elements and types of forest road pavements has been developed and proposed. The essence of the different in type and scope repairs of the roads with ballast, crushed stone, asphalt and without pavement is substantiated, for the three types of repairs - current, medium and basic.
- others.

4.3. Applied contributions

- The work of the different types of modern tractors for timber export - FENDT 412 Vario and LKT-82T, on the territory of individual forestry and the production results achieved by the new specialized forestry tractors for timber export, with in order to clarify the nature of the problems arising from their operation and maintenance.

- The productivity of the tracked and wheeled specialized forest tractors -TDT-55 "Onezhets" and TAF-658 in logging and timber export was compared and it was proved that the machines are profitable for the territory of the forestry, despite the lower daily productivity of tracked tractors, when operated on sites with a higher concentration of felling.

-The productivity and profitability of manual extraction with chainsaws and machine extraction with Valmet 911 harvester and Valmet835 forwarder were studied and fast measures for carrying out felling in plantations affected by drying on the territory of SFE Zemen were applied and it was proved that the machine extraction is more - cost-effective for carrying out timely activities in felling and peeling of wood affected by diseases and insect pests.

-A new classification of road repair works has been developed. The parameters of the damages on the roadway, the reasons for their occurrence and their main characteristics have been studied. The necessity and essence of the maintenance and repair of the forest roads has been proved and three types of repairs are recommended - current, medium and basic.

- A set of measures applied in winter maintenance of roads, in connection with their protection from snow, the fight against icing of the road surface and the protection of roads from avalanches in mountainous areas.

- others.

4.4. Methodological contributions

- The methodology for determining the individual transport costs, including the costs for construction and maintenance of forest roads, extraction and export of timber in different options for transport of timber in forest areas and selection of the optimal option with the lowest costs.

-The methodology for determining the optimal road scheme such as density and location of the road network in forestry has been improved. The technical and economic aspects of the transport development of the forest territory with roads are considered and mathematical models for optimizing the density of the forest road network are developed and tested.

- others.

The significance of the contributions in the scientific works of the candidate is expressed in the enrichment of the theory and practice in the field of repair, maintenance and development of the forest-road network; technologies and mechanization of forestry and utilization of forest resources, etc.

Dr. Madzhov has the necessary skills, experience and masters very well the modern tools for conducting research.

5. Reflection of the candidate's scientific publications in the literature.

Attached is a reference from the candidate for 68 citations of 26 scientific papers. Of these, citations in peer-reviewed journals (SCOPUS, Web of Science) – 1 pcs. ; and citations in unreferenced journals and collections of conferences and monographs - 67 pcs.

6. Participation in research projects.

The candidate for AP "Associate Professor" is a manager of 2 projects from the E20 group funded

by FRI-BAS. Participates in the teams of 10 projects from groups E18 and E 19. A reference with the described name of the contracts, financing and duration is attached.

7. Assessment of the personal contribution of the candidate.

The publishing scientific and implementation activity of the candidate, the supported scientific, scientific-applied, applied and methodical contributions show that they are a personal and independent work. He is a well-known specialist in the scientific circles at home and abroad.

8. Critical remarks and recommendations.

I did not find any fundamental inaccuracies or errors in the scientific works.

Nevertheless, there are some shortcomings, omissions, incompleteness, etc., in the layout of scientific papers.

Not all publications clearly disclose scientific and applied contributions.

Recommendation: To increase his scientific work as a research supervisor of doctoral students.

9. Personal impressions.

The materials presented in the competition are very well formed and significant in content.

In general, the following summaries can be made based on the materials submitted by the candidate Dr. Madzhov for participation in the competition:

- The research and implementation activity is purposeful and in-depth.
- Much of the scientific work is devoted to current issues in the field of forest melioration, forest protection and equipment used in forestry.
- The scientific and scientific-applied contributions of the candidate are significant and indisputable.
- Chief Assistant Professor Dr. Svetozar Madzhov is an established specialist in the field of forestry.


10. Conclusion.

The materials presented in the competition meeting the requirements of LDACRB, the Rules for its application and the Rules of FRI - BAS, as the relevance and importance of the scientific and scientific-applied contributions contained in the works, the achieved implementation in engineering practice, allow me to recommend to the respected scientific jury to evaluate positively the scientific works on the competition.

In connection with the above, I propose Chief Assistant Dr. Eng. Svetozar Ivanov MADZHOV to be elected for the academic position of "Associate Professor" in the professional field 6.5. "Forestry", scientific specialty "Forest melioration, forest protection and special uses in forests" for the needs of the section "Forestry and management of forest resources" at the Institute of Forestry - BAS.

Date: October 09, 2020

Member of NZH:

/prof. dr. eng.  Kr. Georgieva/