REVIEW

of the materials, submitted for participation in a competition for holding the academic position of **Associate professor** in higher education area 6. *Agrarian sciences and Veterinary medicine,* professional field 6.5 *Forestry*, scientific specialty *Forest reclamation, forest protection and special uses in forests* for the needs of section Forestry and forest resources management with the Forest Institute - BAS.

In the competition for Associate professor, advertised in State Gazette, iss. 56/23.06.2020 and on the website of the Forest Institute (FI) for the needs of section Forestry and forest resources management, participated the candidate principal assistant Svetozar Ivanov Madzhov, PgD Eng from FI - BAS.

Reviewer: Prof. Hristo Beloev, DTSc, Professor, Professional field 5.1. Mechanical Engineering from the University of Ruse Angel Kanchev, Corresponding Member of BAS.

1. Brief biographical data of the candidate.

Principal assistant Svetozar Ivanov Madzhov, PhD Eng was born on 04.10.1976. He finished the French High School in Sofia and in 2000 he graduated from the Forestry University with the qualification engineer - forester. He obtained educational and scientific degree Doctor with the thesis topic Research and optimization of the parameters of a distribution and management system for in-stock spare parts for TK – 80 tractor engines. He works in design and construction of forest roads, studies the state of these roads and collaborates in developing a strategy for the improvement of the forest – road network, develops and implements norms for design of the road network.

2. Conformity of the candidate's documents and materials with the required ones according to the Regulations of FI - BAS.

The documents submitted for participation in the competition for the academic position of Associate professor meet the requirements of the LDASRB, the Regulations for implementing it and the Regulations for terms and procedures for acquiring scientific degrees and holding academic positions in the Forest Institute with BAS.

The works of the candidate are in the scientific specialty *Forest reclamation, forest protection and special uses in forests* and concerns the following research and practical fields: Forest roads; Technology and mechanization of forestry; Reliability of machinery and inventory management.

The research developments submitted for reviewing meet the requirements and standards for academic publications in FI – BAS and the author's analyses, estimates, personal research and applied contributions presented stand out clearly.

3. Evaluation of the research, applied and publication activities of the candidate. General description of the materials presented.

The candidate, Principal assistant Svetozar Madzhov, PhD, participates in the competition for the academic position of Associate professor with 1 monograph and 47 publications, published in prestigious journals in Bulgaria and abroad. He has presented scientific works No. 1 – 7, connected to the dissertation defended for the educational scientific degree Doctor and scientific works No. 8 – 11 – for the academic

position Principal assistant at the FI with BAS. I have not reviewed works No. 1-11, but I take them into account in the total assessment of the candidate.

A. Participation in scientific, applied and educational projects.

Principal assistant Svetozar Madzhov, PhD has participated in 12 projects: in 2 of them he has been scientific supervisor, and in the other 10 – a participant.

B. Characteristic of the scientific results published.

I classify the publications in the following way: in foreign referenced journals – 8 (SCOPUS or Web of Science); in Bulgarian referenced journals – 3. (Other databases); in collections from scientific forums – 36 / in national ones – 1 and in international – 35/. The candidate has published his scientific works in: Cyrillic/Bulgarian and Russian/–37, and in English – 9.

By number of co-authors the distribution is as follows:16 are stand-alone, 18 – with one co-author, 6 – with two co-authors and 4 – with three and more.

By position in the collective works the candidate is first in 8, second – in 13, third – in 4 and other – in 2.

Svetozar Madzhov, PhD has not presented division protocols for the shared participation in the collective works, so I assume his participation is equal to that of the remaining authors. The analysis of the scientific and applied contributions shows that they are personally achieved by Svetozar Madzhov, PhD himself. His individual approach can be perceived in all of his publications, and he is exact in his citations. The large scope of scientific fields in which Svetozar Madzhov has worked and the wide area of his scientific interests is indicative of his ambitions as a scientist and professional in the chosen scientific area. Consequently, both the level of the candidate's achievements and his independence as a scientist are indisputable.

C. Reflection of the candidate's scientific publications in the scientific works of other scientists.

The total number of citations of Svetozar Madzhov's works is 68. Of them the citations in referenced journals (SCOPUS, Web of Science) – 1; and citations in non-referenced journals and proceedings from conferences and monographs– 67.

4. Main scientific, research and applied contributions.

The contributions in the scientific production are built on the reliability of the conducted research, which has scientific, applied and methodological nature and can be referred to the following groups:

A. Scientific contributions.

1.As a result from a scientific study, the type and parameters of the laws for distribution of the resource of engine element for Komatsu SAA4D104E-1, the law of distribution of spare parts orders for excavator loaders Komatsu WB93R-5, and the intensity of order flow for spare parts have been proven for the first time; the 80% gamma resource of the engine elements with censured samples has been determined (B 4.6, B 4.7, B 4.8). It has been proven that the reduced costs in the service sector can be achieved through optimization of the structure and parameters of the system for maintenance and repair of equipment with different mathematical methods and models. (B 4.6, B 4.7, B 4.8).

2. Models for optimal management of the spare parts stock for even and uneven consumption (B 4.1) have been developed and a new model for considering and reporting the influence of the irregularity of forestry activities on the need for spare

parts has been proposed (B 4.2). New mathematical models for optimizing the stock of spare parts, needed for maintaining the operability of the machines have been proposed and approbated. The influence of the basic parameters of the models on the change of total costs and the volumes of supplies has been studied (B 4.1, B 4.2)
3.A model for maintenance of forest roads has been proposed and the reliability indexes and characteristics have been determined (D 5.1).
4. A probabilistic model for optimizing the number of loaders in the warehouse of the logistic scheme has been proposed, proving that the optimal number of loaders is between 3 and 4 (D 8.34, D 8.35).

B. Scientific and applied contributions

1. The performance of a cutting machine B1ber-70, in processing wood waste from the wood processing industry into energy chips, as well the main factors that determine it have been justified. An optimal scheme for honing of the blades and new models of honing blades, considerably cheaper than the original, have been proposed (B 4.9, B 4.10).
2.Systematization of the main operational coefficients of forest roads, necessary for determining the frequency and volume of repair and maintenance work on the road surface has been proposed, as well as methods for determining the periods between the individual repairs and the service life of the road surface (D 5.1, D 8.21, D 8.22, D 8.30). The types of road works during the different seasons, depending on the atmospheric conditions have been systematized and it has been proven that there are significant differences in the different seasons, which calls for different types and numbers of forest road recovery activities (D 5.1, D 8.13, D 8.14, D 8.23).
3. It has been proven that a considerable reduction of costs in the machine maintenance sector can be achieved by optimizing the structure and parameters of the system for technical maintenance and repair by different methods, which guarantee their efficient implementation (D 8.18, D 8.19).

C. Applied contributions

1. The performance of various types of modern timber trucks - FENDT 412 Vario and LKT- 82T has been studied and the performance outcome as a result of using the new specialised timber trucks has been analysed to clarify the nature of the problems, arising from their operation and maintenance (D 8.2). Additionally, the performance of chained and wheeled specialised forestry tractors TDT-55 „Onezhets" and TAF-658 in logging and timber export has been compared, and it was determined that the machines are profitable in the forest, irrespective of the lower daily performance of the chain tractors (D 8.3).
2. In the study of two models from the most common brands of chainsaws in logging in Bulgaria - Husqvarna 365 and Stihl MS 361, it has been determined that Husqvarna 365 demonstrates better indicators (G 8.15).
3. A new classification of the road repairs has been proposed and the need and essence of maintenance and repair through ongoing, interim and overhaul repair has been proven (G 5.1, G 8.8, G 8.10).

D. Methodological contributions

1. The methodology for determining transport costs, including the costs of building and maintaining forest roads, logging and export of timber with different modes of transport has been further developed and an optimal version with the lowest costs has been chosen (D 8.12). The methodology for determining the optimal road scheme by the

density and location of the forest road network has been improved (G 8.1, G 8.7, G 8.8, G 8.25, G 8.26, G 8.27).
2. New methods for determining the location of the central and other storage houses, as well as methods for selecting a transport company to supply raw materials and others have been proposed (D 8.31, D 8.32).

5. Assessment of the applicant's personal contribution
The analysis of the types of contributions shows that they are the personal and individual work of Dr. Svetozar Madzhov. The citings in all his studies and the scientific monograph are accurate and I don't see any controversy as to the originality of his findings. It can be noted that even in scientific publications with co-authors, his style of presenting the results and organising the material in the papers can be clearly perceived.

6. Clarity, accuracy, consistency and justification of the scientific production statement.
The research papers and the scientific monograph are presented clearly and accurately. The results obtained are justified and clear and relevant to theory and practice.

7. Level of design, research and analysis of results from the study
Formulation of the research results and analyses are executes at a very good level. The language and style used by the candidate are scientific, with proper use of scientific terminology.

8. Do the materials and concepts from the published bibliography and other sources (incl. the Internet) have references in the research papers presented for the competition?
The candidate correctly refers to the scientific production of other authors and I have not detected elements of incorrect referencing.

9. Critical notes
I will take the chance to make a few methodological suggestions for the future work of Principal assistant Svetozar Madzhov, PhD since with acquiring the academic position of Associate professor, he will become a supervisor of young scientists and PhD students. I propose that he should pay attention to the following:
♦Not everywhere has clarity and accuracy of the problem posed been achieved, and the timeliness for raising it justified;
♦Not everywhere has the structure of the research works been well chosen.
♦Most of the conclusions in the research works are clear and well-formulated, but not all;
♦Captions under the figures should be meaningful enough;

10. Personal impressions
I do not know Principal assistant Svetozar Madzhov, PhD, but he has impressed me with his rigour in what he is doing and his consistency. The monograph presented for participation in the competition is a study with contributions to theory and practice.

Conclusion

From the analysis of the scientific production and business qualities of the applicant, Principal assistant Svetozar Madzhov, PhD, I find that he is worthy of the academic position Associate professor. He meets all scientific, normative, professional and ethical criteria of the requirements of the LDASRB, the Regulations for implementing it and the Regulations for terms and procedures for acquiring scientific degrees and holding academic positions in the Forest Institute with BAS to become an Associate professor in the higher education area 6. Agrarian sciences and veterinary medicine; professional field 6.5 Forestry; scientific specialty Forest reclamation, forest protection and special uses in forests for the needs of section Forestry and forest resources management with the Forest Institute - BAS.

23.10.2020

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Reviewer:

/Cor. Mem. Prof. Hristo Beloev, DTSc/