REVIEW

by prof. Sc.D Eng. Anton Slavchev Georgiev, Medical University - Varna

on the materials submitted for participation in a competition for the academic position of "professor" in the professional field 5.2. Electrical Engineering, Electronics and Automation, specialty "High Voltage Technics", announced in the State Gazette no. 7/ 23.01.2024, for the needs of the Department of Medical Equipment, Electronic and Information Technologies in Healthcare of the Medical University – Varna

In the competition for a professor, announced in the State Gazette, no. 7/23.01.2024 and on the website of the Medical University - Varna for the needs of the Department of Medical Equipment, Electronic and Information Technologies in Healthcare at the Faculty of Public Health, as the only candidate participates Assoc. PhD. Ing. Margreta Parashkevanova Vasileva, Member of the Department of Medical Equipment, Electronic and Information Technologies in Healthcare and Head of this Department.

1. BRIEF BIOGRAPHICAL DATA

In the period from 1982 to 1987 Margreta Parashkevanova Vasileva was a student at Higher Mechanical and Electrical Engineering Institute - Varna (now Technical University - Varna). She graduated in 1987 as an engineer in electrical power engineering, and an educational degree that corresponds today to a Master's degree.

In the period 2000 - 2004, he was a part-time doctoral student at the Technical University - Varna, at the Electric Power Engineering department, speciality "High Voltage Technics".

Since 1995 until 2019, Eng. Margreta Vasileva was a teacher at the Technical University - Varna, having successively held the academic positions of assistant, senior assistant, chief assistant and associate professor.

Margreta Parashkevanova Vasileva, Associate Professor, Ph.D. Eng., was the Deputy Dean of Electrical Engineering at the Faculty of Electrical Engineering in the period 2011-2015.

Since 2015 until 2019, she was the Deputy Rector for the academic activities of TU - Varna.

From 2019 to the present, she is the Head of the Department "Medical Equipment, Electronic and Information Technologies in Health Care" of the MU - Varna.

2. General description of the presented materials

Candidate Assoc. PhD. Eng. Margreta Vasileva participated in the competition with 33

scientific publications, of which:

• Scientific publications in publications that are referenced and indexed in world-famous databases – 14;

• Scientific publications in non-refereed journals with scientific review or in edited collective volumes - 19.

The candidate has submitted an Academic Reference for the publications, citations and scientific profiles:

Indicator „A": 50 points (at required minimum of 50 ponts)

Indicator „B": 195 points (at required minimum of 100 ponts)

Indicator „Г": 238,35 points (at required minimum of 200 ponts)

Indicator „Д": 170 points (at required minimum of 100 ponts)

Indicator „E": 203,34 точки points (at required minimum of 200 ponts)

To certify the achieved results and scientific achievements according to the indicators listed above, the following documents have been submitted:

• to cover the minimum scientometric indicators in Group „A", a diploma for awarding the educational and scientific degree "Doctor" was presented, with a dissertation on the topic "Limiting overvoltages in electrical networks 20 kV";

• to cover the minimum scientometric indicators in Group „B", 10 peer-reviewed scientific publications in English, referenced in the international SCOPUS database, were selected;

• to cover the minimum scientometric indicators in Group „Г", a total of 23 peer-reviewed scientific publications were selected, of which 4 are referenced in the international SCOPUS database;

• to cover the minimum scientometric indicators in Group „Д", a reference was provided for 17 citations, entirely in scientific publications, referenced and indexed in databases with scientific information;

• to cover the minimum scientometric indicators in Group „E", 6 research projects have been selected, one of which is under the leadership of Accos.Prof.Vasileva; supervision of three successfully defended doctoral students; issued two textbooks and two teaching aids for the needs of university education.

Assoc. Prof. Vasileva is registered in the NACID Register "for academic positions and dissertations" of habilitated academic staff, whose works have met the requirements of the scientometric indicators for the academic position of "Associate Professor". In the candidate's report, materials certifying the fulfillment of the scientometric indicators for occupying the academic position "associate professor" and acquiring the educational and scientific degree "PhD" are presented.

The publications with which the candidate Assoc. PhD. Eng. Margreta Vasileva participated in the competition for professor I classify in two groups:

Depending on the language in which they are written, the papers are:

• in English - 28 items;

• in Bulgarian - 5 copies.

According to the number of co-authors of the presented publication, the following can be noted:

• Independent – 2;

• With one co-author – 8;

• With two co-authors – 14;

• With three co-authors – 9.

3. Reflection of the candidate's scientific publications in the scientific space (known as citations)

The reference made in the ***Scopus database*** shows that Assoc. Prof. PhD. Eng. Margreta Vasileva has a high degree of approbation of her scientific and scientific-applied achievements:

• publications indexed in the world databases of Scopus - 25 items;

• citations in publications indexed in the Scopus databases - 57 items /cited in 38 publications/, of which 42 items are references in publications by other authors;

• h-index: 4.

According to the reference made in the ***Google Scholar database***, Prof. Vasileva has:

• indexed scientific publications 31;

• citations 106;

• h-index: 6;

• i10-index: 4.

According to a reference from the ***Researchgate database***, Assoc. Prof. PhD. Eng. Margreta Vasileva has:

• 50 indexed scientific publications, of which: 7 books, 37 conference reports and 6 articles in scientific journals;

• citations 104;

• h-index: 6;

4. General characteristics of the applicant's activity

4.1. Educational and pedagogical activity

The candidate's teaching activity can be summarized by teaching students in the following academic disciplines:

- High voltage technology
- High voltage equipment
- High voltage technology in medicine
- Electrotechnical materials
- Technical safety

- Sanitary equipment

Assoc. Prof. PhD. Eng. Margreta Vasileva is the author and co-author of 25 study programs, 6 textbooks and teaching aids have been published.

She participated in 5 educational projects under national programs and in 1 under an international program.

4.2. Scientific, scientifically applied activity and innovative activity

Assoc. Prof. PhD. Eng. Margreta Vasileva participated in research projects from various scientific programs and funds in the period 2009-2023.

There are 3 successfully defended doctoral students.

4.3. Contributions (scientific, applied science, applied)

I fully accept the scientific, scientific-applied and applied contributions formulated by Accoss. Prof. Vasileva. Contributions to the candidate's scientific research activity are divided into areas according to the type of scientific research and their application. They are summarized as: proving existing scientific problems with new, original ways and means; creation of new models, methodologies, methods and technologies in the fields of application investigated by Accoss. Prof. Vasileva (model studies of occurrence and limitation of overvoltages in electrical systems, research of wave processes in grounding installations of electric power facilities, analysis of essential aspects in ensuring electrical safety in electric power systems, development and research of models for presentation and analysis of processes occurring in electrical equipment and others.).

Contributions to the field of modeling studies of the occurrence and limitation of overvoltages in electrical systems

• Three-phase simulation models of electrical systems for high voltage have been developed in the Matlab Simulink program environment for researching wave processes.

• Three-phase simulation models of an electrical system with a nominal voltage of 220 kV have been developed in the *ATP-EMTP* program environment for tracking atmospheric, commutation and established overvoltages.

• Research regarding the protective characteristics and energy resistance of surge protection devices in low, medium and high voltage electrical systems has been conducted. Conclusions have been made and recommendations have been made regarding the choice of protective devices, taking into account the influence of the network configuration and the type of overvoltages acting on it.

• Overvoltage levels for a 220 kV electrical substation have been determined and ways to limit them in the event of a direct lightning strike in the vicinity of the substation and in the event of switching overvoltages have been proposed. An analysis of the various

factors affecting the levels of overvoltages occurring in 220 kV substations was made.

• An approach is proposed for obtaining evaluation values regarding the reliability of the surge protection system of an electrical substation in cases where it consists of valve drains characterized by different operating parameters.

• Useful simulation models have been developed, in the *Matlab Simulink* program environment, for visualizing the processes in power systems. The created models are suitable both for training students and for raising the qualifications of the responsible staff in the Electric Power System (EPS).

Contributions in the field of research of wave processes in the grounding installations of electric power facilities

• A simulation model was created in the Matlab Simulink program environment to study the processes in grounding installations under the influence of lightning current, applicable to any configuration and location of the lightning strike.

• A dependence has been derived for determining the maximum contact voltage in an end corner cell of an earthing network for the case of a pulsed lightning current flowing at any of its points.

• On the basis of conducted experimental studies, original relevant possibilities for determining the specific resistance and relative dielectric permeability of soil, at any frequency, are presented and argued; as a result of the accumulated empirical experience, a method was proposed for determining the specific electrical resistance of the soil, at a frequency of 50 Hz.

• A simplified method is proposed for considering a two-layer structure of the soil when determining the maximum contact stress with a derived expression.

Contributions to the field of electrical safety in the power systems

- Original simulation models were developed in the Matlab Simulink program environment of a low-voltage electrical network and of single-phase residual current protection to perform a more precise analysis of electrical safety.
- A computer program has been developed to determine the risk of lightning damage, taking into account all additional components of any type of risk. Two additional modules have been developed to evaluate the effectiveness of protection against direct lightning strikes in wind farms.
- An evaluation of the effectiveness of the lightning protection from a direct lightning strike for the territory of a wind farm using the lightning arrester system of the single wind generators was made, according to the current Bulgarian and European standards.

• Contributions in the field of model studies of processes in electrical equipment

A simulation model of a solid dielectric with partial discharge developing in its volume was developed in the Matlab Simulink program environment and a variant model study of partial discharge in different dielectric media was presented. Derived recommendations related to different magnitudes of applied voltage and different sizes of air inclusion.

• Model studies were done in Matlab Simulink of processes in 20 kV electrical networks under the influence of atmospheric overvoltages. Results are presented and recommendations are proposed for setting up fast-acting relay protections and choosing the energy capacity of metal oxide valve taps, so that the fast-acting relay protections are not activated incorrectly from atmospheric overvoltages.

• Model studies of processes in drivers and integrated LED circuits have been made. Presented results and derived recommendations related to their functional capacity and efficiency with different LED connection methods.

• The parameters necessary for modeling a current measuring transformer in Matlab have been determined based on known catalog parameters and experimental measurements. The results of the model study of a specific current measuring transformer are presented and recommendations related to its operation in various types of short circuits for the purposes of relay protection are presented.

• A replacement scheme of a metal oxide valve drain has been developed for the investigation of thermal processes under the influence of atmospheric pressures. Model studies were done in Matlab and formal conclusions were drawn regarding the energy resistance of the investigated valve outlet.

After reading the articles describing the candidate's claimed contributions, I was convinced of their originality and significance. The author's claims for contributions in the field of: *models of the occurrence and limitation of overvoltages in electrical systems, the study of wave processes in grounding installations of power plants, models, the study and analysis of electrical safety in power plants systems and the modeling of processes in electrical equipment* are accurate, reasonable and fully justified.

5. Evaluation of the candidate's personal contribution

The attached documents, provided by Assoc. Prof. PhD. Margreta Vasileva, participating in the procedure for occupying the academic position of "Professor", show that the candidate fulfills requirements of the Academic Staff Development in Republic of Bulgaria Act (ASDRBA) as well as the corresponding Rule for Implementation of that Act, and the additional requirements of the MU - Varna in the professional field 5.2. Electrical Engineering, Electronics and Automation, specialty "High Voltage Technics". It is worth noting that in almost all groups of indicators, Assoc. Prof. PhD. Margreta Vasileva has accumulated points that significantly exceed the minimum requirements recorded in (ASDRBA).

The list of achievements attached to the competition documents testify to the indisputable authority that the candidate has built among colleagues from the academic community. Evidence of this and recognition of her tireless, competent and dedicated work are the responsible academic positions that Prof. Vasileva has held over the past thirteen years: Department Head, Deputy Dean, Deputy Rector, etc. .

As a scientist and researcher, she has proven herself to be a respected specialist and expert in the community of power engineers dealing with the problems of high voltage technology. Assoc. Prof. Vasileva's articles and reports presented by her at authoritative scientific forums have always caused serious scientific interest.

6. Critical Notes

I have no critical remarks about the materials presented by the candidate.

7. Personal impressions

I have known Associate Professor PhD. Margreta Vasileva since 2011, when she was elected Deputy Dean for Academic Affairs at the Faculty of Electrical Engineering at Varna Technical University. In this academic position, Associate Professor Vasileva stood out from the rest of her colleagues Deputy. deans, with their competence, benevolence and dedicated commitment in solving every case that arose in the curricula and plans, and their responsible attitude to the problems related to the educational activity in the Faculty of Electrical Engineering. These qualities of hers were appreciated by the entire academic staff of the Technical University, and without any hesitation or doubt, Associate Professor Vasileva was unanimously elected as the Deputy Rector for Academic Activities of TU - Varna, in 2015 - 2019. As Deputy Rector, she continued her tireless work to improve the educational process at the University, finding time to solve even the various individual problems of students and teachers. Thanks to her hard and tireless work, the study plans and curricula of all specialties at the University were corrected and updated. The successful student candidate campaigns conducted under her leadership were instrumental in the increased number of students enrolled during her tenure. Under her leadership, all the accreditations of the University and of all its scientific fields were successfully carried out.

After the formation of the new department at Varna Medical University, in 2019, Associate Professor Margreta Vasileva was unanimously elected Head of Department, and recently, also unanimously, she was re-elected to this position.

As I indicated above, Assoc. Prof. Vasileva's qualities as a scientist and researcher are indisputable. I am impressed by the volume and creativity of the scientific work carried out, the significance of the results achieved and the thorough and precise analyzes made as a result of the research. It is also important to note the significant applied significance and practical value of her scientific achievements.

As a teacher, she manages to reduce the complex matter and theoretical postulates of the academic disciplines she teaches to understandable and clear practical advice and messages that will be useful to current students in their formation as future specialists.

She is respected by all colleagues and loved by students.

The review written here and the findings in it are the result of both my personal impressions of the candidate's work, as well as the data on the candidate's impressive scientific achievements and the information about her teaching activities attached to the competition documents.

6. Conclusion

In view of the above, I strongly recommend that the academic position of "Professor" be awarded to Margreta Parashkevanova Vasileva, Associate Professor PhD. Eng., in the professional field 5.2. Electrical Engineering, Electronics and Automation, specialty "High Voltage Technics", for the needs of the Medical University - Varna.

09.05. 2024 г. Reviewer: **prof. Sc.D Eng. Anton Slavchev Georgiev**

...../