O P I N I O N

by Assoc. Prof. Eng. Borislav Tsonev Stoyanov, Ph.D., Technical University of Gabrovo, Department „Industrial Technologies and Design“

on the materials submitted for participation in a competition for the academic position of „Associate Professor“ in the
field of higher education – 5. Technical Sciences,
in the professional field – 5.1. Mechanical Engineering,
specialty – Manufacturing Technology.

In the competition for Associate Professor, announced in the State Gazette No. 53/09.06.2026 and on the website of TU-Gabrovo, for the needs of the Department of „Industrial Technologies and Design“ at the Technical University of Gabrovo as participating candidate is Senior Assist. Prof. Eng. Kalin Vladimirov Anastasov, Ph.D. from Technical University of Gabrovo.

1. Review of the content and results of the submitted works

The documents submitted by Senior Assist. Prof. Eng. Kalin Vladimirov Anastasov, Ph.D for the competition for the academic position of "Associate Professor" comply with the Law on the Development of the Academic Staff in the Republic of Bulgaria, the regulations for its implementation, and the Regulations for the Acquisition of Scientific Degrees and the Occupation of Academic Positions at the Technical University of Gabrovo.

The materials include: a dissertation for the award of the educational and scientific degree of "Doctor" (PhD); a habilitation thesis consisting of 14 related scientific publications in international journals with an Impact Factor, indexed in Web of Science; 1 refereed scientific publication; 13 publications in non-refereed but scientifically peer-reviewed journals; 43 citations in refereed and indexed globally recognized databases; 12 citations in non-refereed but scientifically peer-reviewed journals; as well as 1 textbooks and 1 study guide - all of which are relevant to the subject matter of the competition.

The quantitative requirements for the academic position of "Associate Professor," as stipulated by the Regulations for the Acquisition of Scientific Degrees and the Occupation of Academic Positions at the Technical University of Gabrovo, have been met.

The scientific works included in the submitted materials fall within the following research areas: the design and investigation of combined, hybrid, and sustainable plastic deformation processes aimed at improving "Surface Integrity" (SI) and enhancing the

fatigue strength and fatigue life of metal components. Investigation of the technological inheritance affecting Surface Integrity (SI) in combined, hybrid, and sustainable manufacturing processes involving cutting and plastic deformation; study of the influence of tool material type on Surface Integrity (SI) during combined plastic deformation processes; manufacturing processes and tooling for the high-pressure die casting of aluminum and zinc alloys; investigation of sustainable versus conventional cutting processes and their impact on the Surface Integrity (SI) of the machined surface; research into resistance to intergranular corrosion; modification of the surface layers of tool steels via laser processing; analysis of the technological capabilities of CNC machine tools in ensuring consistent surface characteristics during the turning of profiled surfaces; additive manufacturing processes.

The first group of studies examines the effectiveness of combined, hybrid, and sustainable surface plastic deformation (SPD) processes - specifically diamond burnishing and SPD using a toroidal deforming roller - with the aim of enhancing fatigue strength and fatigue life, as well as improving key Surface Integrity (SI) characteristics of the surface layers of metal components. The second group of studies examines the technological heredity between cutting processes and surface plastic deformation (SPD), the correlations between them, and their influence on fatigue strength, fatigue life, and key characteristics of the surface integrity (SI) of metal components.

The third group of studies investigates the effectiveness of surface plastic deformation (SPD) processes - utilizing a deforming element made from the cermet alloy "Ferro-Tic Grade C" - in terms of enhancing fatigue strength and fatigue life, as well as improving key characteristics of the surface integrity (SI) of metal components.

2. General characteristics of the candidate's activities

2.1. Educational and pedagogical activity (work with students and doctoral candidates)

According to the submitted record, Senior Assist. Prof. Eng. Kalin Vladimirov Anastasov, Ph.D. has delivered lectures in 9 subjects, as well as laboratory and seminar exercises in 9 subjects, all of which are included in the curricula for Bachelor’s and Master’s degree programs within the Faculty of Mechanical and Precision Engineering at the Technical University of Gabrovo.

2.2. Scientific and research activities

The candidate, Senior Assist. Prof. Eng. Kalin Vladimirov Anastasov, Ph.D., has participated in 1 national research project funded through European programs, as well as in 4 projects funded by the national budget, for which the Technical University of Gabrovo is the beneficiary.

2.3. Implementation activity

The candidate, Senior Assist. Prof. Eng. Kalin Vladimirov Anastasov, Ph.D., demonstrates significant implementation activity. Under his guidance, two companies - Armako Industries - Lyaskovets and Easy Plast BG EOOD – Gabrovo - have reported the implementation of five technological processes into their production operations.

2.4. Other activity

According to the submitted report, Senior Assist. Prof. Eng. Kalin Vladimirov Anastasov, Ph.D. has actively participated in the maintenance and modernization of equipment and tooling for the "Plastic Injection Molding" laboratory, as well as in the modernization and outfitting of Laboratory 1005 with tools and equipment, to facilitate laboratory exercises for the courses "Technology of Plastic Products" (TIP) and "Molds and Tooling" (MI).

3. Contributions (scientific, applied-research, practical) and their significance for science and practice

The contributions presented in the summary of the author’s work are clearly formulated, methodologically carried, and well-substantiated, encompassing both scientific-applied and applied results.

The scientific-applied contributions include the following: "A new method for the surface plastic deformation (SPD) of external cylindrical surfaces, termed 'Slide Roller Burnishing' (SRB), has been theoretically substantiated and experimentally validated. It utilizes a deforming element featuring a toroidal roller, reduces surface roughness by approximately a factor of two compared to similar processes, generates significant compressive residual stresses at depth, and creates a favorable surface texture suitable for improving tribological performance under boundary friction conditions"; "A robust combined process for machining shafts and axles made of heat-treated 42CrMo4 steel has been developed, involving sequential dry turning and SPD. It has been demonstrated that, at a deforming force of 50 N, the fatigue limit under rotary bending increases by 20 MPa, while fatigue life improves by more than 70 times compared to dry turning alone," among others.

The practical contributions are as follows: "Based on a holistic approach, it has been demonstrated that the wear of the cutting insert during preliminary turning influences the subsequent diamond burnishing (DB) process of normalized and quenched-and-tempered C45 steel. This leads to a significant increase in surface microhardness and a drastic rise in the absolute value of axial compressive residual stresses at depths of up to 0.1 mm. A clear correlation has been established between the wear of the cutting insert along the principal flank face, the structure of the affected layer, and the fatigue limit of

normalized and quenched-and-tempered C45 steel following turning and diamond burnishing"; "The values of the governing factors for a mixed single-pass process using diamond tools have been determined with regard to the achieved surface roughness and the requirement for enhanced wear resistance," etc.

I accept the formulation of the contributions presented by Senior Assist. Prof. Eng. Kalin Vladimirov Anastasov, Ph.D., as well as their number, as significant and relevant to the subject of the competition.

4. Evaluation of the candidate's personal contributions

According to the submitted report, the candidate has produced 8 sole-authored scientific works, 5 scientific works in which the candidate is the first author, and a total of 12 scientific works published in international journals indexed in SCOPUS and WoS; these figures significantly exceed the requirements for participation in the competition. This data leads me to conclude that the candidate demonstrates exceptional commitment and independence in their research work, serving as evidence of their competence and personal contribution.

5. Critical remarks and recommendations

Senior Assist. Prof. Eng. Kalin Vladimirov Anastasov, Ph.D., scientific work is consistent and methodologically prepared. For his future development, strengthening international collaboration is recommended. Expanding the experimental infrastructure and establishing interdisciplinary projects would further enhance the visibility and practical significance of his research, while also contributing to his further consolidation as a specialist in the field.

6. Personal impressions

I know Senior Assist. Prof. Eng. Kalin Vladimirov Anastasov, Ph.D. through our collaboration within the department where we both work. My impressions of him are extremely positive. He is a highly responsible, motivated, and goal-oriented professional who demonstrates consistency and commitment in both his teaching activities and his scientific research. He treats his colleagues and students with fairness and respect, and he consistently displays initiative, a strong team spirit, and a drive for self-improvement. He is a composed and reliable individual upon whom one can depend for the execution of professional and academic tasks.

7.Conclusion

Based on the scientific works submitted, I support and recommend that Senior Assist. Prof. Eng. Kalin Vladimirov Anastasov, Ph.D. to be appointed to the academic position of Associate Professor in the
field of higher education – 5. Technical Sciences,
in the professional field – 5.1. Mechanical Engineering,
specialty – Manufacturing Technology.

Gabrovo
28.10.2026

Chairman of the Scientific Jury: ……
/ Assoc. Prof. Eng. Borislav Stoyanov, Ph.D./