

OPINION

by **Dr. Eng. Borislav Hristov Milenkov**,
Associate Professor, University of Food Technology – Plovdiv

of a dissertation for the award of educational and scientific doctorate degree

in: field of higher education: 5 – Technical Sciences;

professional field: 5.3 "Communication and computer technology";

Doctoral program: "Automation of areas of the intangible sphere (medicine, education, science, administrative activities, etc.)"

Author: Hristo Atanasov Kanevski

Topic: "Application of computer technologies to improve environmental performance in road transport"

Scientific supervisor: Prof. Dr. Eng. Slavi Yassenov Lyubomirov

1. General presentation of the procedure and the doctoral student

By order No. PD 23-93 of 17. 01. 2025 of the Rector of Plovdiv University "Paisii Hilendarski" (PU), I am appointed as a member of the scientific jury for ensuring a procedure for the defense of a dissertation on the topic "**Application of computer technologies to improve environmental performance in road transport**", for the acquisition of the educational and scientific degree "doctor" in the field of higher education: 5 "Technical Sciences", professional field: 5.3 "Communication and Computer Engineering", doctoral program: "Automation of areas of the intangible sphere (medicine, education, science, administrative activities, etc.)". The author of the dissertation is Hristo Atanasov Kanevski - a doctoral student in full-time study at the Department of EKIT with scientific supervisor Prof. Dr. Eng. Slavi Yassenov Lyubomirov from the "Paisii Hilendarski" University.

The set of materials on paper presented by M.Eng. Hristo Atanasov Kanevski is in accordance with Art. 36 (1) of the Regulations for the Development of the Academic Staff of the University of Plovdiv, and includes the following documents:

- a request to the Rector of the University of Plovdiv to disclose the procedure for defending a dissertation;
- CV in European format;
- minutes from the department council, related to reporting the readiness to open the procedure and preliminary discussion of the dissertation work;
- dissertation;
- abstract in Bulgarian and English;
- a list of scientific publications on the topic of the dissertation;

- copies of scientific publications;
- list of noted citations;
- declaration of originality and authenticity of the attached documents;
- a statement of compliance with the minimum requirements.

The doctoral student has submitted 6 (six) publications related to the topic of the dissertation.

The doctoral student currently holds the academic position of "assistant" in the Department of EKIT at PU "P. Hilendarski". Before that, he gained practical experience in a car service. His main activity was diagnostics and repair of passenger cars.

2. Relevance of the topic

Protecting the environment and bringing the most popular means of personal transport (cars) into a "nature-friendly" mode is a problem for all governments. In recent years, the EU has adopted increasingly strict regulatory frameworks regarding harmful emissions from internal combustion engines.

Therefore, the ability to "identify and apply computer technologies to improve environmental performance in road transport is extremely important and undoubtedly beneficial for everyone."

Therefore, I believe that the topic of the dissertation under consideration is relevant and contributes to reducing harmful emissions emitted during the operation of internal combustion engines.

3. Knowing the problem

In the development of the dissertation, the dissertation candidate, M.Eng. Hristo Kanevski, has used 131 titles, all of which are in Latin (English), concerning research in the field of his subject. It is noteworthy that for 23 of the literary sources, links from the Internet are indicated, and these links are from the last 4 (four) years. The main part of the cited works (over 80%) have been published in the last 10 years.

4. Research methodology

The dissertation is 155 pages long, including 81 figures, 12 tables, organized into an introduction, 4 chapters, general conclusions, scientific and applied contributions.

To achieve the goal of the dissertation "Application of computer technologies to improve environmental performance in road transport", 5 (five) well-formulated tasks have been set.

In the first chapter, based on a literature study, the characteristics of the main sources of pollution in road transport that affect air pollution and which emissions have the most adverse impact on the environment and nature as a whole are specified.

Chapter two focuses on the problems caused by deposits in internal combustion engines, their impact on power and their environmental performance.

In the third chapter, simulations of various internal combustion engine malfunctions are made and how they affect the emissions produced during its operation.

Chapter four presents a study on the influence of fuel/air ratio and ignition angle on harmful emissions from a gasoline engine. The study was conducted with a BMW 318 gasoline engine, us-

ing a laboratory bench that allows monitoring of its main parameters and operating processes.

5. Characterization and evaluation of the dissertation work and contributions

I assess the presented dissertation work as useful for the scientific community. Five scientific-applied and five applied contributions have been achieved, the most important of which are:

- * An experimental setup and methods for studying various internal combustion engine malfunctions and their impact on harmful emissions have been implemented and tested;

- * Factors influencing harmful emissions from internal combustion engines using spark ignition and electronic control units have been studied. A comparative analysis of the results has been conducted;

- * Research and data analysis have been conducted on the influence of the fuel-air mixture ratio on the composition of the exhaust gases. The results obtained show that in the ratio range from 15:1 to 17:1, harmful emissions of CO₂, CO and HC have minimal environmental consequences;

- * Studies of electronically controlled gas nozzles that have an impact on harmful emission levels have been performed and presented.

6. Assessment of the doctoral student's publications and personal contribution

6 (six) articles are attached to the materials for the procedure. Of these, 3 (three) are in English, co-authored with the scientific supervisor, and the rest are in Bulgarian.

Two of the articles in Bulgarian were published in the scientific works of the "Union of Scientists in Bulgaria", one of which the doctoral student is an independent author.

One of the articles in English is referenced in (Scopus/Web of Science/Q4).

In all articles that are co-authored, the doctoral student is the first author.

All articles examine different aspects of the dissertation work.

There is no information about citing any of the articles.

7. Autor's abstract

The abstract is presented in Bulgarian and English. It consists of 32 pages, including contributions and publications related to the dissertation work. The abstract reflects the overall content of the dissertation and highlights its contributions.

8. Recommendations for future use of the dissertation contributions and results

In view of the future development of the candidate, I recommend that he conduct experimental studies on the movement of the car in urban and suburban conditions. I believe that the studies and the obtained results could be useful to all specialists in this field. Especially when it comes to the results obtained during rush hours and in heavy traffic.

CONCLUSION

The dissertation work contains scientific-applied and applied results that represent an original contribution to science and meet all the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADSRB), the Regulations for the Implementation of the ADSRB and the relevant Regulations of the Paisii Hilendarski University.

The dissertation shows that the doctoral student, M.Eng. Hristo Atanasov Kanevski, possesses in-depth theoretical knowledge and professional skills in the scientific specialty "Automation of areas of the intangible sphere (medicine, education, science, administrative activities, etc.)", demonstrating qualities and skills for independently conducting scientific research.

Due to the above, I confidently give my positive opinion to the developed dissertation work, abstract, achieved results and contributions, and I propose to the esteemed scientific jury to award the educational and scientific degree "doctor" to M. Eng. Hristo Atanasov Kanevski in the field of higher education: 5. Technical sciences, professional direction, 5.3. "Communication and computer technology", doctoral program "Automation of areas of the intangible sphere (medicine, education, science, administrative activities, etc.)".

24 February 2025 years

Prepared the opinion:

Assoc. Prof. Dr. Eng. Borislav Milenkov