

OPINION

by Eng. Velko Slavechev Rupetsov, PhD

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Department of Mechanical Engineering and Transport

of a dissertation for the award of the educational and scientific degree "**Doctor**"

in: field of higher education 5. Technical Sciences

Professional Field 5.1. Mechanical Engineering

Doctoral Program: “Methods for Controlling and Testing Materials, Products, and Equipment”.

Author: Nikolay Asenov Toshev

Topic: Research on Active Safety Systems in Automobiles

Scientific Supervisors: Assoc. Prof. Dr. Kaneta Ilieva Paskaleva
Prof. D.Sc. Georgi Atanasov Mishev

1. General presentation of the procedure and the PhD student

By Order No. RD-22-1060 dated 09.05.2025 of the Rector of Plovdiv University “Paisii Hilendarski” (PU), I was appointed a member of the scientific jury for conducting the procedure for defense of the dissertation titled "Research on Active Safety Systems in Automobiles", for the acquisition of the educational and scientific degree "Doctor" in the field of higher education 5. Technical Sciences, Professional Field 5.1 Mechanical Engineering, Doctoral Program “Methods for Controlling and Testing Materials, Products, and Equipment”. The author of the dissertation is Nikolay Asenov Toshev – full-time PhD student at the Department of Mechanical Engineering and Transport, with scientific supervisors Assoc. Prof. Dr. Kaneta Ilieva Paskaleva and Prof. D.Sc. Georgi Atanasov Mishev from Plovdiv University “Paisii Hilendarski.”

The set of materials submitted by Nikolay Asenov Toshev on paper medium is in compliance with Art. 36 (1) of the Regulations for the Development of the Academic Staff at PU and includes the following documents: an application to the Rector of PU for initiating the dissertation defense procedure; a European-format CV; a protocol from the departmental council concerning the readiness for initiating the procedure and the preliminary discussion of the dissertation; the dissertation; an abstract; a list of scientific publications related to the dissertation topic; copies of the scientific publications; a declaration of originality and authenticity of the submitted documents; and a compliance report regarding the minimum national requirements. The PhD candidate submitted four publications on the dissertation topic. The documentation is prepared accurately and correctly.

The dissertation by M.Eng. Nikolay Toshev is presented in a volume exceeding 170 pages, containing clearly structured sections: introduction, four main chapters, conclusion, findings, contributions, list of publications, and appendices. The material is systematically and comprehensively organized, covering a literature review, research methodology, experimental results, and their interpretation. Tables, graphs, and figures are included to illustrate the outcomes of real experiments conducted with automobiles and active safety systems.

M.Eng. Nikolay Asenov Toshev is a graduate engineer in transport technology. He works actively in the field of automotive engineering and technical safety. He is the author of several scientific publications presented at reputable conferences and journals. His professional orientation and academic training are fully aligned with the theme of the dissertation.

2. Relevance of the topic

The topic is highly relevant in the context of increasing road traffic, the rise in road traffic accidents and the global demand for safer vehicles. Active safety systems (e.g., ABS, AEB) are leading technologies in modern automotive engineering. The aim of the dissertation – to study the capabilities of these systems to reduce the risk of accidents – is fully justified. The research objectives are logically connected to the aim and formulated in a contemporary manner.

3. Knowledge of the problem

The PhD candidate demonstrates in-depth knowledge of the subject matter. The literature review is extensive, critical, and incorporates modern sources, including international developments and standards. It is evident that the author has analyzed both theoretical concepts and practical implementations and technological solutions.

The list of references includes 135 sources. The majority of the cited literature comprises journal articles indexed in Scopus and Web of Science. Most publications are in English and a significant portion have been published after 2020, indicating a thorough analysis of the current state of the research topic. In the course of working on the dissertation, the PhD candidate performs an analytical evaluation and creative interpretation of the literature, applying original ideas in the development and execution of the experimental studies.

4. Research methodology

The studies were conducted under real road conditions using modern measurement equipment (e.g., EnergoSM 4.0). A methodology was developed including a comparative analysis with and without functional ABS/AEB systems, under varying road surfaces, speeds, and tires. The data were analyzed using statistical and mathematical models.

5. Characteristics and evaluation of the dissertation and contributions

The dissertation is scientifically grounded, methodologically justified, and practically applicable. The content is analytical, with precise conclusions and clearly formulated generalizations. Each section logically leads to the next. The credibility of the material is supported by experimental validation and modern analysis.

6. Assessment of publications and personal contribution of the PhD student

The PhD candidate defines several scientific-applied and applied contributions, including:

- Development of methodologies for assessing the effectiveness of ABS and AEB;
- Determination of the influence of tires, road surfaces, and speed on braking characteristics;
- Creation of a database and model for predicting behavior during emergency braking;
- Proposals for integrating the results into academic curricula and technical expertise.

The candidate is the author of 4 scientific publications, including: 1 article in a journal with impact factor (Scopus); 2 papers presented at international conferences; 1 publication in a national scientific proceedings.

The publications are thematically related to the dissertation and present key results, including experimental data and applied analyses.

7. Abstract

The abstract is concise and clearly formulated, corresponding to the content of the dissertation and accurately presenting the main results, objectives, and contributions. It meets the requirements for such documents.

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

There are no significant methodological weaknesses. It is recommended that future research include a wider range of vehicle models and additional climatic conditions (e.g., ice, fog). The inclusion of data from real-world incidents integrated into the model would also be beneficial.

CONCLUSION

The dissertation contains scientific-applied and applied results, representing an original contribution to science and meeting all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Rules for Implementation of the LDASRB, and the relevant regulations of PU “Paisii Hilendarski.”

The dissertation demonstrates that PhD candidate Nikolay Asenov Toshev possesses a high level of technical and methodological training, as well as the capability for independent scientific

research. He has profound theoretical knowledge and professional skills and exhibits qualities for conducting independent scientific investigations and potential for further academic development.

For the aforementioned reasons, I confidently provide my positive evaluation of the conducted research, as presented in the reviewed dissertation, abstract, achieved results, and contributions, and I recommend to the esteemed scientific jury to award the educational and scientific degree “Doctor” to Nikolay Asenov Toshev in field of higher education: 5. Technical Sciences, Professional Field 5.1 Mechanical Engineering, Doctoral Program: Methods for Controlling and Testing Materials, Products, and Equipment.

09.06.2025

Prepared by:

(Assoc. Prof. Dr. Eng. Velko Rupetsov)