

OPINION

regarding: **dissertation for awarding educational and scientific degree "Doctor"**

Author of the dissertation research: **Miroslava Damyanova Robinson**

Dissertation research topic: **"Optimizing the management of marine coastal macro-litter along the Bulgarian Black Sea coast"**

Professional field: **5.5. Transport, navigation and aviation**

Doctoral program: **"Systems and devices for environmental protection"**

to the Department of "Ecology and Environmental Protection" at the Faculty of Shipbuilding

Member of the Scientific Jury: **assoc. prof. dipl. eng. Anna Kostadinova Simeonova, PhD, Technical University of Varna**

The opinion was prepared on the basis of Order No. 87/09.02.2026 of the Rector of TU-Varna for the selection of a scientific jury, based on the abstract provided to me.

I believe that in terms of structure, volume, content and presentation, the abstract fully complies with the requirements of the *Regulations for the admission, training of doctoral students and acquisition of the educational and scientific degree "doctor" and the scientific degree "doctor of sciences" at the Technical University - Varna.*

1. Relevance of the problem developed in the dissertation

Marine litter (ML) is one of the qualitative descriptors for determining the state of the marine environment (Descriptor – 10), regulated in the EU Marine Strategy Framework Directive (MSFD 2008/56/EC). The main objective of the MSFD is “Achieving good status of the marine environment by 2020”. The criteria and methodological standards for achieving the main objective of the MSFD set requirements for assessing the characteristics of litter in all components of the marine environment – coastline, seabed, water column and water surface. Through effective monitoring, information can be provided on trends in quantities, accumulation, seasonal dynamics, sources of ML pollution, which can support national and regional assessments of litter in marine waters.

This dissertation work is related to the management of coastal macro-litter, with a focus on monitoring optimization, which is a key factor for the accuracy and representativeness of the results obtained. In this regard, an experimental study of the ML accumulation in a selected polygon on the northern Black Sea coast was conducted, using drone technologies in addition to the generally applied monitoring methods. This aims to provide an answer to the applicability of drone technologies in the monitoring of marine coastal litter, which will significantly accelerate and facilitate the monitoring methodology applied so far. In this sense, the problem considered in the dissertation is definitely relevant and the obtained results are useful for practice.

2. Indication and assessment of the most significant contributions in the dissertation, clearly stating the nature of the contributions

I accept essentially author-defined contributions - one scientific and six scientific-applied. More significant contributions that can be distinguished are:

Scientific contribution: Methodology was developed for testing the drone monitoring applicability on ML load along the shore line.

Scientific-applied contributions: One-year, four-season monitoring of coastal marine macro-litter was conducted with determination of the seasonal dynamics of waterline changes in a

selected polygon "Orlovo blato"; Drone monitoring was applied in the selected polygon and the accuracy of the method was compared with the conventional monitoring; It is proposed that the comparison of ML results should be carried out on the basis of its density, in order to provide accurate, up-to-date and representative information.

The indicated contributions can be defined as solving existing problems with new means, as well as creating new research methods. The nature of the contributions can be attributed to the enrichment of existing knowledge and the application of scientific achievements in practice. The dissertation work as a whole can be defined as a scientific result achieved through justified and proven solutions to private problems. A new scientific field is not formulated, but scientific prerequisites for further development are created.

3. Critical remarks and recommendations

In general, I have only some recommendations to the dissertation, which in no way belittle the scientific work:

1) The dissertation work determines the seasonal shift of the waterline and, accordingly, the area of the studied sections, in order to correctly determine the ML accumulation by density. In this sense, it is good to give a more in-depth analysis of the relationship between the seasonal dynamics of each section area and the ML density, as well as the compatibility of the data based on the number or weight of ML for scientifically based assessments of the status. I recommend the doctoral student to continue its research in this field for the future, as it is key for a correct assessment of coastal marine litter accumulation.

2) Not sufficiently justified are the reasons for the significant differences of the ML densities in the two experimental sections, during one and the same season - especially in the winter, considering their identical physical and geographical characteristics (exposure, wind field, currents, etc.).

4. Motives and a clearly formulated conclusion.

The dissertation work of Miroslava Damyanova Robinson is an in-depth study related to the possibilities for improving the monitoring and management of coastal ML in Bulgaria. The dissertation work has clearly expressed scientific and scientific-applied contributions. I believe that the doctoral student has successfully coped with the formulated tasks and the set goals have been achieved.

The dissertation **fully covers the criteria** laid down in the *Law on the Development of the Academic Staff in the Republic of Bulgaria* and the *Regulations* for its implementation.

Bearing in mind the undoubted significance of the dissertation, I give my positive assessment and consider that educational and scientific degree "Doctor" can be awarded to Miroslava Damyanova Robinson in professional field: 5.5. Transport, navigation and aviation, doctoral program: "Systems and devices for environmental protection".

25.03.2026 г.
Varna

Scientific Jury Member:.....
/assoc. prof. Anna Simeonova, PhD/