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NAVAL ACADEMY "N.Y.VAPTZAROV"

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"FILII MARIS
SUMUS"

PERSONAL OPINION

on dissertation work for awarding PhD degree

Subject of the dissertation: "FLOATING CAISSON OF TYPE PNEUMO STRUCTURE"

Author of the dissertation: dipl. Eng. Gencho Dinev Georgiev, PhD student at the "Ocean Technologies" dep. of the IO-BAS Varna.

Author of the opinion: Prof. eng. Dimitar Yordanov Dimitrakiev, PhD, Naval Academy "N.Y. Vaptzarov" - Varna.

1. Relevance of the developed problem

In the dissertation a new type of floating pneumatic structure has been developed, which solves some of the problems related to the construction of hydraulic structures intended for different purposes in the continental shelf. For this purpose, floating hydraulic structures are widely used in world practice. The PhD student proposes that efforts are to be focused on the creation of new and the improvement of existing types of caissons, which will reduce the expenditure, the material costs and deadlines for construction of hydraulic facilities.

In the dissertation the problems are studied and solved on the field, while using the experience obtained so far.

The conclusions and recommendations are generally valid and may apply to all marine activities.

The problems outlined in this field of study are global and the dissertation is especially relevant in this respect.

2. Does the doctoral student know the state of the problem and does he evaluate in a creative way used information sources?

Presented to me dissertation is written in a volume of 118 pages. It is formed in four chapters, 60 figures, three tables and 1 appendix. The bibliography includes 70 titles.

The doctoral student has a Master's degree in Hydrotechnical Construction of Waterways and Ports. He has worked as a research associate at the IO-BAS Varna, Chief expert and Chief Inspector at the Port Administration Executive Agency.

Gencho Georgiev's professional qualification helps him in solving the problems that are studied in the dissertation. In carrying out the development, he used a large amount of information materials related to the technical operation and construction of complex hydraulic structures. The doctoral student used the accumulated experience in the design and construction of several unique developments originating from the time of the operation of the many Maritime Institutes in Varna.

The professional knowledge of the problems is obvious, as well as the ability to find the best technical means in the realizing classical and new modern studies.

The work corresponds to the set goal, the object and the subject of research.

The doctoral student Gencho Georgiev shows the necessary theoretical knowledge and practical skills that allow him to properly analyze and summarize the collected theoretical and empirical data.

The dissertation resume is compiled according to the requirements and reflects the main parts of the dissertation. In terms of content, the contributions mentioned in the resume objectively reflect the achievements of the doctoral student.

The used literature was evaluated in a creative way, a good and thorough analysis was made in the favor of the research on the topic of the dissertation, with correct references to the sources. As a result, well-founded conclusions are made and the purpose and tasks of the dissertation are precisely formulated.

In the first chapter a detailed analysis of the hydrotechnical constructions used in the world practice is made, as well as their advantages and disadvantages are outlined in the work. The chapter ends with a proposal for a new type of caisson with pneumatic support. The problem was solved by the doctoral student with an invention and a patent for a caisson that can withstand heavy loads in shallow and deep water areas.

In the second chapter the purpose and tasks of the dissertation are formulated.

The third chapter describes in detail the new construction of a caisson proposed by the doctoral student, which he names "a caisson of a new type of pneumatic construction". The doctoral student claims that when implemented, it will be one of the most economical and universal structures in hydraulic engineering. A methodology for determining the main elements of the caisson is applied. In the conclusions to the chapter, it is declared that the study of the buoyancy and stability of the new facility is a novelty in the engineering practice.

The fourth chapter describes the results of the theoretical and seaworthy research of the proposed caisson of a new type of pneumatic construction.

At the end of the dissertation, conclusions and recommendations are made, supporting the implementation in practice of the floating caisson type pneumatic construction.

This gives me reason to conclude that the dissertation prepared by Gencho Dinev Georgiev is a completed research of a up to date and significant problem for the theory and the practice.

3. Do the proposed methodologies give an answer to the set goals and objectives of the dissertation

The methodology proposed and experimented by the doctoral student for conducting the theoretical and seaworthy study of the proposed floating caisson type pneumatic construction accurately and reasonably provides answers to the set goals and objectives of the dissertation.

4. Contributions of the dissertation

I fully accept the doctoral student's claims for scientific-applied and practical contributions as follows:

Scientific applied contributions:

1. A caisson of a new type is proposed - a floating pneumatic construction, which is a novelty in the hydraulic engineering construction and it has no analogue in the world practice. The construction is applicable in hydraulic engineering for the construction of gravitational facilities subjected to high loads in the aquatic environment on any type of ground in shallow and deep water areas.

Practical contributions:

1. A method has been developed for placing a caisson pneumatic structure with the help of back pressure / vacuum /.

2. The operating parameters of a floating caisson type pneumatic construction have been validated in order to determine some basic hydrodynamic features (stability, resistance,

seaworthiness, etc.), necessary for transportation to the place of its installation in a certain hydraulic facility.

3. Recommendations are formulated for ensuring the structural characteristics of a caisson pneumatic structure at a certain configuration of its parameters in terms of static stability and the required power applied during its towing.

4. Recommendations have been formulated for ensuring the structural characteristics of the pneumatic caisson structure and requirements have been set in respect of the insulation and airtightness of the reinforced concrete, as related to the variable external temperature and the impact of the aggressive sea water.

5. Application of the results of the dissertation work in practice

In the documents presented to me are attached as well:

1. Invention for a new type of caisson - floating pneumatic construction, with copyright certificate № 44643 / 08.07.1985, patented in Bulgaria with patent № 1147, in the Netherlands with patent № 8 701 423, in France with patent № 2 616 464, in Finland with patent № 890047, in Singapore (China) with patent № 89100199.9 and in Russia with patent № 7774529/03).

2. Invention with copyright certificate № 91624,1990 for a method for placing a caisson - floating pneumatic structure with back pressure (vacuum).

I consider this to be a sufficient reason to accept categorically the applicability of the development in practice.

6. Notes and recommendations

I believe that the doctoral student has the knowledge and the opportunity to develop his work in a larger volume. I accept that the relatively short dissertation has been developed as such only for the purpose to focus on specificity of the problem and on the practical applicability of the issue. However, I do not consider this a shortcoming of scientific work. The research and the results obtained may be a rational basis for student's future research on the use and development of caissons in hydraulic engineering.

7. Resume

The presented resume is in a volume of 35 pages. It meets the requirements and very well reflects the content of the dissertation.

CONCLUSION

The dissertation work "FLOATING CAISSON TYPE PNEUMO-STRUCTURE" meets the requirements of the Law on the Development of the academic staff in the Republic of Bulgaria and the Regulations for its application for acquiring scientific degrees and holding academic positions.

Gencho Dinev Georgiev has the necessary professional qualification and proven competence.

I propose to the esteemed scientific jury to award Dipl. Eng. Gencho Dinev Georgiev the educational and scientific degree "DOCTOR" under the doctoral program "Oceanology" in professional field 4.4. Earth Sciences.

06 July 2020 r.
Varna

Prepared
(Prof. Eng. Dimit