

# CONCEPTUAL DESIGN FOR THE CONSTRUCTION OF A TRAINING SHIP

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Maritime transport is a major way of transporting goods globally. It is one of the fastest growing sectors, which needs excellent staffing. For this reason, the preparation of future maritime specialists is of utmost importance. The main problem in their preparation is the practical part of the training or, more precisely, the floating practice that each student has to accomplish.

In order to determine the main problem points, a survey was made among the students at the Navy Vaptsarov Water University, who were asked about their impressions of the sailing experience. Of these, 78% of returning students note that they have not received enough support and attention from the officers responsible for it, which in turn leads to less real knowledge. According to 71%, it is better to have more and more frequent internships. Another problem that points to the trainees is that, depending on the ship on which the traineeship is held, practical knowledge is obtained that only applies to the particular type of ship. This eventually caused a lot of problems when starting a job as a young officer on another type of ship.

Also, some respondents note that responsible officers are unable, even willing, to pay enough attention to cadets due to their professional duties on board the ship. Evidence that the problem of the practical training of future marine personnel globally is one of the main topics of the IMO meeting in Lodn this year. Here's what IMO Maritime Ambassador to Bulgaria said cap. D. Dimitrov:

*... „Future masters and mechanics find it hard to find traineeships before their first qualification. The reason is that our country does not have a training ship in which to organize organized practices for all students and students of maritime specialties. The problem has long existed since Bulgaria had a training ship - the ship „Nikola Vaptsarov” - by the mid-1990s. All graduating students and pupils at the Marine High School had the opportunity to organize their internships under the supervision of a lecturer. Since then, unfortunately in the country, trainees are looking for an opportunity on their own. Some of the big companies accept interns and trainees after the second and third year of approved programs. But those who are not approved need to look for alternatives in smaller companies themselves. And for the acquisition of seafarership, it is mandatory to practice as chief engineers and mechanics. Before completing, everyone must have completed a 6-month voyage abroad”...*

Looking at the aforementioned problems in the practical training of future maritime specialists, it was decided to deepen the problem and suggest a vision for its solution. Based on the information that has been found about good practice in training across countries, it has emerged that leading naval states have put their training ships on their training ships. Such ships also use countries such as: France with its „Almak”, Japan - „Spirit of MOL”, as well as Russia, the UK and South Korea. This type of training enables students to learn in a practical environment by not interrupting the relationship with their teachers. This leads to the construction of much more skilled and trained staff.

Based on the above, a training ship project was developed that meets the following criteria:

- Be equipped with state-of-the-art training simulators;
- To recreate the practical conditions of most types of ships in order to be able to prepare future specialists for the conditions and practices of the various ships;
- To combine theory and practice;
- To be multifunctional to encompass the widest range of training of different maritime specialists;
- To be sure and to ensure the safety of people on board during work and training.

As a result of the set criteria, I was able to develop a training vessel ideally. Practical training will be provided by separate modules that will enable students to familiarize themselves with the systems and mechanisms of the main four types of ships worldwide. These are container, car, tanker and bulk carrier (bulk carrier) and will be able to provide staff training for cruise ships as well. Each module will provide the opportunity for real practical training on loading and unloading activities, maintenance,

familiarization and proper operation of the specific machines and mechanisms and the characteristics of the ship type. The location of the individual modules is tailored to the intended load to ensure the stability of the ship.



*3D visualization of the training vessel*

The tanker module is located in its nose, where the ship is designed to be double-decked and double-bottomed to ensure the safe transport of oil and other petroleum products. This section provides all types of pumps and equipment for proper and safe operation in order to recreate the real conditions of the tanker. The envisaged maximum volume for the transport of liquid cargo is 6 000 m<sup>3</sup> and they are divided into six tanks of 1 000 m<sup>3</sup>.

In the center of the ship are the bulk cargo and container sections, separated from oil tanks with a double watertight bulkhead. Due to the different structural safety requirements for the transport of the two different types of cargo (for carrying containers - double decks, bulk carriers - double bottom), the ship is also planned to be double-decked and double-bottomed. This constructive solution would give the ship extra strength and resistance to bending and twisting.

In its bulk section, the ship can carry a maximum of 8 875 m<sup>3</sup> and in the container module between 140 and 220 containers. The loading and unloading activities for both parts are secured by an onboard crane.



The car transport section is planned to be 200 - 300 carriages and will be located on four decks. Loading and unloading will be done by a hydraulic loading ramp in the stern of the ship.

The projected dimensions of the ship are: length 205 m., width 30 m., draft 9 - 10 m. with total capacity of 200 people - crew, trainers and trainees.

In the third part of the ship, the superstructure of the ship and the ro - ro part (transport of vehicles and other equipment) are envisaged. In the first part are envisaged: Living rooms for a total of 230 people (about 80 - 110 cabins); Two lecture halls with a total capacity of 100 people (2x50 people each); Two canteens with a total capacity of 200 people for the students; Stellar Hall for 50 people - to provide practical and theoretical preparation of the students of the „Caribbean” specialty for the correct removal of stars and the location of the ship; Second Bridge - to train and introduce the students of the „Carving” specialty in the real management of Ship; Radiocentric Center; Virtual Reality Simulator - for conducting ship safety exercises, as well as the possibility of virtual acquaintance, assembling and dismantling of systems and mechanisms; Two training workshops - to be trained in practice and enrolled in the students' specialty „Ship machines and mechanisms” and „Ship Electrical Equipment”, Medical Center - it will consist of a hospital with a capacity of 20 people, a dental office and an operating room.



The ship is planned to be diesel - an electric power to make it more environmentally friendly and cost effective. Four diesel generators with a capacity of 14,400 kW (19,300 hp) Wärtsilä 12V46F each are provided to provide the necessary power supply. The propulsion system will be built from two 20,000 (27,000 hp) aspirators each and one WTT-55 WTT-55 5.5 kW (7.400 hp) turbocharger, which should provide very good maneuverability and maximum ship speed of 16 - 20 knots.



The so designed training vessel with all its simulators and equipment could serve to train the following specialties:

- „Shipbuilding”, „Ship machines and mechanisms” and „Ship electrical power generation” - With theoretical and practical training tailored to the real sea conditions;
- „Waterway Management”, „Fleet and Port Operations” and „Logistics” - with the theoretical and practical training in finding and providing cargo, equipment, supplies and food for the

ship. Conducting internship from the University, together with its trainers, on agency and management of water transport;

- „Military medicine” - an opportunity to practice at the medical center of the ship.

In my opinion, there are two main ways to successfully implement and implement this project: The first is to make a global collaboration between maritime academies from Europe and the world to finance, build and maintain an international training fleet where students from the participating maritime academies. The second is to make a joint co-operation between the leading shipping companies to finance and build a common training fleet from where they can build their future seafarers. There is also no middle-class option where countries and businesses can cooperate in this direction.



The design and construction of the training vessel will provide an opportunity to increase the total number of internships during the training, and students will be able to start in the first years of their training. It will provide a better quality of practical training and a more sustainable knowledge of the different systems, mechanisms, facilities and specificities of the different types of ships. Also, the availability of such a training ship will provide a very good reconciliation of theory and practice, an opportunity to train all ship's naval majors and build more motivated marine personnel.

I think that the realization of such a project would greatly increase the quality of training and would provide the opportunity for a more flexible university policy on craft work.

*Information and photos: Svetoslav Georgiev*