

## **Topic: Ship Design**

### **Synthesising information from different sources**

The following excerpts contain information on the topic of **Ship Design**. Read them carefully and:

- Using information from **all** excerpts, write a paragraph of 140 words (not less than 110 and not more than 160) discussing the most important features of **Ship Design**.

**You must:**

- Use information from **all sources**.
- **Cite your sources appropriately.**
- **Paraphrase and summarise appropriately! You must not plagiarise!**

#### **Excerpt 1**

In ship design it is often necessary to classify the hulls and to find relationships between forms and their properties, especially the hydrodynamic properties. The coefficients of form are the most important means of achieving this. By their definition, the coefficients of form are non-dimensional numbers. The foundation of ships' design is a combination of art, technology, and commercial purpose. The latest technologies concerning the equipment used for navigation, propulsion, and cargo handling form a strong influence on the final build. The multitude of cargoes carried by sea increases at great speed, and this necessitates the building of a more advanced ship design, more frequently. It is difficult to deal with the complexity of the foregoing, but the nature of man is such that he will always strive to find a solution to the problems at hand. A solution comes along sooner rather than later, and this triggers a demand for an even better product.

[1] A. Biran and R. Lopez-Pulido, *Ship Hydrostatics and Stability* (2<sup>nd</sup> ed.). Oxford: Butterworth-Heinemann, 2013.

#### **Excerpt 2**

Design is a process of synthesis bringing together a wide range of disciplines and analysis methods. In the past, ship design was a process of evolution, the starting point for a new design being a type ship to which changes were made. With modern analysis tools and powerful computers, the naval architect can be more innovative. Ships, however, are complex and their design must be approached in a methodical manner. There are no prototypes so the designer must 'get it right' first time. There are three distinct phases – concept, contract and detail design. It is in the concept phase that the designer will establish the broad characteristics of the design in consultation with the owner. The actual design process within each phase varies with the type of ship and how novel it is. One approach is to regard the ship as possessing certain capabilities and attributes which confer upon it the ability to float, move and trade – the three key functions. Everything in the ship has a part to play and the design configuration is key to the development of a good design. Also, an understanding of the relationships between equipment and systems, enabling them to contribute to the functions, is important. Embedded within the design process are assessments of the ship's characteristics such as stability, strength, powering, manoeuvrability and motions. The design must be cost-effective, require minimum manning, be available when needed and not be unduly vulnerable. The safety of the ship, the people on board and the environment in which it sails are all important.

[2] E. C. Tupper, *Introduction to Naval Architecture*. Amsterdam, London: Elsevier/Butterworth-Heinemann, 2013.

#### **Excerpt 3**

Ship designers make an extensive use of computers as they perform a myriad of calculations when they have to present several variants in the design stage. However, one has to note that for the time being computers are mostly used to work out designs that were once made without computers by carpenters and shipwrights. Computers in ship design are a question of 'how' rather than 'what.' Computer-aided Ship Design, shortly CASD, is today an

emancipated, full discipline within the Computer-aided Design (CAD) domain. However, these fine examples of software are *solid modellers*, i.e., they work with three-dimensional objects. We have seen that surfaces, among them the hull surface, are two-dimensional objects as the definition of any point lying on them requires two parameters only. Therefore, Naval Architecture requires *surface modelling*.

[3] H. A. Karanassos, Commercial Ship Surveying: On/Off Hire Condition Surveys & Bunker Surveys. Oxford: Butterworth-Heinemann, 2016.