



МЕТОДИЧЕСКИЕ УКАЗАНИЯ

к практическим занятиям по дисциплине
«Английский язык» для студентов
специальности «Кораблестроение»
факультета МТС 2 курса
дневной формы обучения

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Методические указания к практическим занятиям по дисциплине «Английский язык» для студентов специальности «Кораблестроение» факультета МТС 2 курса дневной формы обучения / Сост. И.И. Строева. – Севастополь: Изд-во СевНТУ, 2008. - 28 с.

Целью данных методических указаний является привить навыки чтения и понимания литературы по специальности «Кораблестроение» факультета МТС студентов 2 курса и ведения бесед на темы, предусмотренные программой.

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ВВЕДЕНИЕ

Данные методические указания предназначены для студентов специальности «Кораблестроение» 2-го курса, продолжающих изучение английского языка на базе знаний, приобретенных ими в университете на 1-ом курсе.

Целью данных практических занятий является развитие навыков чтения и понимания литературы по специальности, умения вести беседу по данной специальности в соответствии с программой.

В указаниях использованы материалы оригинальной технической литературы на английском языке, в частности, журналы Shipbuilding 1989-1998 гг.

Методические указания состоят из 6-и уроков, которые охватывают следующие темы: Types of Ships and Boats, Tonnage of Ships, Dimension of a Ship, Strength of Ships, Stability, Building Systems and Their Characteristics.

Типовой урок имеет следующую структуру:

- текст, несущий профессиональную информацию;
- поурочный словарь;
- упражнения;
- ключ.

Большое внимание уделяется работе с упражнениями, включающими активную лексику профессионального содержания, слова приведены в порядке их следования в тексте. Вопросы к тексту служат основой для всестороннего и систематизированного обсуждения изучаемой темы. Их цель – проверить понимание содержания текста. Контроль осуществляется при выполнении упражнений на перевод с русского на английский языки и составлении диалогов по изучаемой теме.

1. UNIT 1. Types of Ships and Boats

The broadest classification of ships by use distinguishes them as Men of War or **Warships** and Merchant Ships. Any list of warships by types uses soon becomes **obsolete** because during every war and between wars to a lesser extent, certain types of ships tend to disappear while new types are built as the result of the invention of new weapons or the development of new tactics.

Sea-going merchant ships can be classified according to different criteria, as for example by the trade of service in which they are engaged, the kind of cargo they carry, the type of machinery they use, the building system they use, the **tonnages** etc.

Sea-going ships are generally built with their fore and aft line perpendicular to the **shore line**, i.e. they are built and launched endwise while river boats are usually built parallel to the water, i.e. they are built broadside and launched sideways.

Considering the service in which merchant ships are engaged, they may be further subdivided into passenger ships for the transportation of passengers and **cargo ships** or **freighters** which are used for the carriage of different kinds of cargo, such as **bulk cargo**, **liquid cargo**, containers, etc. In addition to these, there exist special types of ships as for example ferry boats, tugs, dredgers, icebreakers, yachts and many others.

Classification of cargo ships. Cargo ships are classified according to the kind of cargo they carry. The following list gives the names of those which are most commonly built today.

- | | |
|-------------------------------|---------------------------------------|
| 1. General Cargo Ships | 8. Container Ships |
| 2. Bulk Carriers | 9. Oil Tankers |
| 3. Ore Carriers | a) Crude Oil Carriers |
| 4. Bulk Ore Carriers | b) Product Carriers |
| 5. Dry Cargo Ships | 10. Liquefied Gas Carriers |
| 6. OBO Ships (ore, bulk, oil) | 11. LNG Carriers (liquid natural gas) |
| 7. Refrigerated Cargo Ships | |

Those cargo ships or passenger ships that keep a definite **route** on their voyage may also be called liners, and those engaged in service or trade along the coast – **coasters**. Cargo ships are spoken of as cargo-passenger ships if they are provided with some accommodation for passengers.

Lloyd's Register of Shipping **issues** an annual report for every year which besides other information and technical data gives a task of **propulsion** analysis of world tonnage. According to this criteria ships may be classified into **steamships** and motorships. Steamships may be **propelled** by:

- Reciprocating Steam Engines
- Reciprocating and LP Turbine (Low Pressure Turbine)
- Steam Turbine Engines
- Turbo Electric Drive (Turbo Generators)

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Motorships may be propelled by:

- Diesel Engines (Marine Diesels)
- Diesel Electric Drive (Diesel Generators)

Some new ships specially designed for gas turbine propulsion are now in service. A ship, which represented a spectacular new development in container transport, was EUROLINER, which was the world's first container ship propelled by a gas turbine.

Some **nuclear ships** propelled by a nuclear power plant have also been built in recent years.

Types of Boats. Boats are vessels of small size usually made of wood or some kind of plastics, for example **fiberglass**. They may be propelled by a petrol or diesel engine, or they may be provided with sails which use the force of wind for their forward motion. The simplest and smallest boats are only provided with oars and they use manpower for going ahead or astern. The following types of boats are in common **use: rowing boats, sailing boats of different types, fishing boats, motorboats, life boats**, etc.

Words and Phrases

warship – военный корабль
 tonnage – тоннаж, грузопместимость
 shore line – урез воды
 cargo ship – грузовое судно
 ore carrier – рудовоз
 bulk carrier – балкер (навалочное судно); сухогруз
 refrigerated cargo ship – рефрижераторное судно
 container ship – контейнерное судно, контейнеровоз
 oil tanker – танкер, нефтеналивное судно
 freighter – грузовое морское судно
 liquid cargo – танкер
 ferry boat – паром
 tug – буксир || буксировать
 dredger – устричное судно
 icebreaker – ледокол
 crude oil – сырая, неочищенная нефть
 LNG (Liquefied Natural Gas) – сжиженный природный газ
 route – путь; маршрут; трасса || прокладывать маршрут
 propulsion – ходкость (судна)
 coaster – судно малого (прибрежного) плавания
 to issue – выпускать, издавать (газеты, книги и т.д.)
 steamship – пароход
 propel – приводить в движение
 reciprocating engine – поршневой двигатель

turbo electric drive – 1) турбоэлектрический привод; 2) турбоэлектрическая гребная установка
 nuclear ship (NS) – атомное судно, атомоход
 fiberglass – стекловолокно
 life boat – спасательная шлюпка
 rowing boat – гребная шлюпка

Exercises

1. Переведите следующие термины и словосочетания, выпишите незнакомые слова.

To a lesser extent; tend to disappear; sea-going merchant ships; fore and aft line; built and launched endwise; built broadside and launched sideways; OBO ships; a definite route; engaged in service or trade; accommodation for passengers; issues an annual report; a spectacular new development; use manpower.

2. Найдите эквиваленты следующих сочетаний в тексте.

Перечень военных кораблей по типу; становится устаревшим, перпендикулярно урезу воды; в зависимости от услуг предоставляемых торговыми судами; для перевозки различных видов грузов; держат определенный курс во время своего плавания (рейса); грузопассажирский корабль; морское судно; судовой регистр Ллойда; технические данные; могут приводиться в движение; использовать силу ветра; являются общепотребительными.

3. Переведите следующие предложения.

- 1) Ships can be classified by use to Men of War or Warships and Merchant ships.
- 2) Sea-going merchant ships may be classified according to the kind of cargo they carry.
- 3) Sea-going ships are generally built with their fore and aft line perpendicular to the shore line.
- 4) According to type of propulsion ships may be classified into steamships and motorships.
- 5) EUROLINER was the world's first container ship propelled by a gas turbine.

4. Выполните самостоятельный перевод предложений с русского языка на английский.

- 1) Мореходные торговые суда могут классифицироваться по различным критериям, в зависимости от сферы, в которой они используются, например, сфера торговли или услуг.
- 2) В сфере услуг торговые судна могут подразделяться на пассажирские и грузовые корабли.

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3) Грузовые корабли могут считаться грузопассажирскими, если предоставляют необходимые удобства для перевозок пассажиров.

4) Лодки могут приводиться в движение при помощи мотора на бензине или дизеле, или же они двигаются благодаря парусам, использующим силу ветра.

5) Судовой регистр Ллойда каждый год выдает отчет с анализом ходкости судов мирового тоннажа.

5. Дайте развернутый ответ на вопрос.

- 1) How can ships in general be classified by their use?
- 2) Why do certain types of warships tend to become obsolete or even disappear?
- 3) According to what criteria may ships be classified?
- 4) A ship may be built perpendicular or parallel to the water.
 - a) How are sea-going ships built?
 - б) How are river boats built?
- 5) Explain the following terms: liners, coasters.
- 6) The ship propelling machinery may be of different types. Specify the types of ship propelling engines.
- 7) Which propelling machinery is most recent?
- 8) What types of boats you can name?

6. Обсудите текст в диалогах, опираясь на вопросы из упражнения 4.

2. UNIT 2. Tonnage of Ships

Displacement. The quantity of volume of water displaced by a ship is called its displacement. It is equal to the weight of the ship. It can be expressed in either cubic feet or tons.

Displacement tonnage. Displacement tonnage usually refers to the weight of the ship at its normal full load.

Deadweight tonnage. Deadweight tonnage is the **designation** of the number of tons a vessel may carry in cargo, stores, water, fuel, passengers and crew.

Gross register tonnage. Gross register tonnage is a measure of volume in units of 100 cubic feet of a ship's total closed-in space minus certain **exempted** areas such as **ballast tanks** and **galleys**.

Net register tonnage is gross tonnage minus spaces **allotted** for machinery, engine room, officers' and **crew's quarters**, alley spaces, spaces used in steering etc.

In general, passenger liners are described in terms of gross tonnage; naval ships in displacement tons; freighters and tankers in deadweight tones.

Net register tonnage is generally used in charging **harbour dues**, canal **tolls**, and similar **charges** to which merchant ships are liable.

Words and Phrases

displacement – водоизмещение

displacement tonnage – весовое водоизмещение

deadweight tonnage – полная грузоподъемность судна, дедвейт

designation – обозначение, наименование

gross register tonnage – валовая вместимость, валовой регистровый тоннаж

exempt – изымать; освобождать

ballast tank – балластная цистерна (морского основания)

galley – камбуз

net register tonnage – чистая регистровая вместимость, чистый/регистровый тоннаж, нетто-тоннаж

allot – распределять; выделять

crew quarters – жилые отсеки, каюты

harbour dues – портовый сбор

toll – пошлина, сбор

charge – налог

Exercises

1. Переведите следующие термины и словосочетания, выпишите незнакомые слова.

Displacement; cubic feet; displacement tonnage; deadweight tonnage; designation of the number; a ship's total closed-in space; gross register tonnage;

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spaces allotted for machinery; charging harbour dues; net register tonnage; merchant ships are liable.

2. Заполните пропуски в предложениях, используя информацию из текста:

- 1) The quantity of volume of water displaced by a ship is called ...
- 2) Displacement tonnage usually refers to ... at its normal full load.
- 3) Deadweight tonnage is ... a vessel may carry in cargo, stores, water, fuel, passengers and crew.
- 4) Gross register tonnage is a measure of volume in units of 100 cubic feet of a ship's total closed-in space minus ... such as ballast tanks and galleys.
- 5) Net register tonnage is gross tonnage minus ... engine room, officers' and crew's quarters, alley spaces, spaces used in steering etc.

3. Выполните самостоятельный перевод предложений с русского языка на английский.

1. Водоизмещение равно весу корабля. 2. Весовое водоизмещение обычно равняется весу корабля при его нормальной полной загрузке. 3. При расчете валового регистрового тоннажа исключаются балластные цистерны и камбуз. 4. Грузоподъемность пассажирских лайнеров представляется в единицах валовой вместимости; морских судов – в тоннах водоизмещения; грузовых морских судов и танкеров – в дедвейт-тоннах. 5. Чистая регистровая вместимость обычно учитывается при расчетах портового сбора, пошлины за переправу через канал и других налогов, которым облагаются торговые суда.

4. Дайте развернутый ответ на вопрос.

- 1) What is the displacement of a ship?
- 2) How can the displacement of a ship be expressed?
- 3) What kinds of tonnage can you name, and how they applied?
- 4) What spaces are deducted from the gross register tonnage to obtain the net register tonnage?

5. Перескажите текст.

3. UNIT 3. Dimension of a Ship

Length between perpendiculars is the designer's length. It is the distance measured parallel to the base line, between **forward and after perpendiculars**.

Length over all is the length from the extreme point of **stem** to the extreme point of **stern**.

Breadth **moulded** is the breadth measured to the outside surface of **fenders** or **plating**. Depth is the vertical distance from the keel at the centerline to the top of the deck **beam** of the highest complete **watertight** deck at the side.

Freeboard is the vertical distance from the water to the **weather deck** edge at any point in the length of the ship, i.e. the amount the ship may sink before water begins to come on the deck at that point. The freeboard at **bow**, stern and **amidships** is usually indicated or stated.

Draught at any point is the vertical distance from the surface of the water to the bottom of the ship, at that point. When measured at or near the stem it is denoted as draught forward and when measured at or near the sternpost as draught aft. The mean draught is the mean value of draughts forward and aft. Most ships are designed to have the same draught forward and aft. Such a ship is called an even keel ship because the keel line is horizontal when it is floating at its designed draught. When a ship has a difference between draughts forward and aft it is said to be out of **trim**.

The maximum draught to which merchant ships may be loaded is indicated by a mark on the side of the ship at the midship section. This is known as the **Plimsoll mark**.

Words and Phrases

dimension – измерение, размеренность; главные размерения (судна)

stem – нос, форштевень

stern – корма

aft(er) perpendicular — кормовой перпендикуляр

fore [forward] perpendicular — носовой перпендикуляр

mould – формировать, делать по шаблону

frame – шпангоут

fender – кранец; наружный привальный брус

plating – обшивка

beam – брус, балка; бимс

watertight – водонепроницаемый

freeboard – надводный борт

weather deck – открытая палуба; верхняя палуба

bow – нос, носовая часть

amidships – посередине корабля

draught – осадка

trim – правильное размещение балласта

Plimsoll mark – грузовая марка

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Exercises

1. Переведите следующие термины и словосочетания, выпишите незнакомые слова.

Designer's length; the base line; from the extreme point of stem to the extreme point of stern; breadth moulded; the highest complete watertight deck; the weather deck edge; draught forward; draught aft; an even keel ship; to be out of trim; Plimsoll mark.

2. Заполните пропуски, используя информацию из текста:

1) Length over all is the length from the extreme point of ... to the extreme point of ...

2) Breadth moulded is the breadth measured to the outside surface of ...

3) ... is the vertical distance from the keel at the centerline to the top of the deck beam of the highest complete watertight deck at the side.

4) ... is the vertical distance from the water to the weather deck edge at any point in the length of the ship.

5) ... is the vertical distance from the surface of the water to the bottom of the ship, at that point.

6) The mean draught is the mean value of draughts

3. Выполните самостоятельный перевод предложений с русского языка на английский.

1) Конструкторская длина – это расстояние, измеряемое параллельно базовой линии между носовым и кормовым перпендикулярами.

2) Предельная ширина – это ширина, измеряемая по внешней поверхности обшивки.

3) Обычно помечают или указывают надводный борт на носу, на корме и посередине корабля.

4) Большинство судов, так называемых плоскодонных кораблей, имеют одинаковую осадку носом и кормой.

5) Максимальная осадка, по которую можно загрузить судно, помечена знаком в срединном отсеке корабля.

4. Дайте развернутый ответ на вопрос.

1) Which length is called the designer's length and what is its abbreviation?

2) What do you call the length from the extreme point of the stem to the extreme point of the stern?

3) What measurements of the ship's breadth are used?

4) Which distance is called the depth of the ship?

5) What do you call the vertical distance from the water to the weather deck edge?

6) What is the draught of a ship?



- 7) What do you call the draught measured
 - a) at or near the stem?
 - б) at or near the sternpost?
- 8) Give the definition of the mean draught.
- 9) What do you call a ship designed to have the same draught forward and aft?
- 10) Explain the statement: The ship is out of trim.
- 11) Where is indicated the maximum draught to which merchant ships may be loaded?
- 12) What is the name of the mark which indicates the maximum draught?

5. Перескажите текст. Составьте аннотацию.

4. UNIT 4. Strength of Ships

A ship structure is **sufficiently** strong if it can support all the **fixed loads** of its machinery, **fittings and equipment** and all the cargo loads, and if it can **withstand** without permanent change of shape, cracking and fracture all the hydrostatic and hydrodynamic loads which can be imposed upon it in calm water or in any kind of seaway in which it is supposed to operate. It is sufficiently **stiff** if, under any of these **service loads**, it does not flex or deform unduly.

The arrangement and disposition of the structural material in a hull and the proportions of the structure, all known as the **configuration**, are the most important features. Structural material in the form of a closed box, like a ship hull with a deck, resists vertical and **lateral** bending and twisting all at the same time. Since some part of this box is in compression for **bending loads**, and much of it is in **shear** for **twisting loads**, the relatively thin shell – bottom, sides and deck – must be prevented from being deformed when it is **strained**. This is done by stiffening with **members** of some convenient type.

The structural material must be so disposed and proportioned that the hull has the minimum weight – and can be built for the minimum cost – to perform all its functions acceptably. A knowledge of how the various parts are stressed, of how **applied loads** are distributed among the various members and how all of them work together is essential in order to place and proportion them in the most effective manner.

Words and Phrases

strength of ships – прочность судов
 fixed load – постоянная нагрузка
 sufficiently – достаточно
 fittings, equipment – оборудование
 withstand – выдерживать
 stiff – крепкий
 service load – рабочая нагрузка

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configuration – конструкция
 lateral – поперечный
 bending load – кренящая нагрузка
 shear – деформация сдвига
 twisting load – скручивающая (крутящая) нагрузка
 to be strained – подвергаться напряжению
 member – эл. элемент конструкции
 applied load – приложенная нагрузка

Exercises

1. Переведите следующие термины и словосочетания, выпишите незнакомые слова.

Ship structure, fittings and equipment, hydrostatic and hydrodynamic loads, service loads, the proportions of the structure, vertical and lateral bending and twisting, relatively thin shell, stiffening with members, to perform functions, in the most effective manner.

2. Найдите эквиваленты следующих сочетаний в тексте.

Подвергаться деформации сдвига, конструкция судна, при рабочей нагрузке, подвергаться напряжению, не меняя формы, пропорции конструкции, подбор и расположение материалов конструкции, изгибающая и скручивающая нагрузки, элемент конструкции.

3. Переведите следующие предложения.

1) Configuration of a ship is the arrangement and disposition of the structural material in a hull and the proportions of the ship's structure.

2) Ship's structural material should resist vertical and lateral bending and twisting all at the same time.

3) The hull of the ship should have the minimum weight to be built for the minimum cost.

4) The ship's hull must perform its functions acceptably, that's why its structural material must be well disposed and proportioned.

5) The structural material used for hull's construction must guarantee its strength.

6) The ship's floodability is directly dependant on its strength.

7) Ship's damage results in decrease of its strength and stiffness because of cracking, fracture and destruction of some of its members.

8) General strength can decrease as the result of applied loads changing.

9) Structural material must resist vertical and lateral bending and twisting to protect the ship from change of shape, cracking and fracture.

10) The ship is sufficiently stiff if it does not flex or deform under any of the service loads.

4. Выполните самостоятельный перевод предложений с русского языка на английский.

- 1) Конструкция судна считается прочной, если она выдерживает нагрузку всего установленного оборудования и груза, который судно перевозит.
- 2) Конструкция судна считается крепкой, если оно не изгибается и не деформируется при рабочей нагрузке.
- 3) Судно должно выдерживать все гидростатические и гидродинамические нагрузки, которые оно может испытывать.
- 4) Изгибающая и крутящая нагрузки воздействуют на днище, борта и палубу судна.
- 5) Относительно тонкий корпус судна не должен деформироваться, когда он подвергается напряжению.
- 6) Специальные элементы конструкции служат для придания прочности корпусу судна.
- 7) Материал конструкции должен быть подобран таким образом, чтобы корпус судна имел минимальный вес.
- 8) Очень важно знать, какому напряжению подвергаются различные части корпуса, и как распределяется приложенная нагрузка по различным элементам конструкции.
- 9) Чтобы добиться прочности корпуса судна, необходимо точно рассчитать параметры его конструкции.
- 10) Приложенные к корпусу нагрузки не должны приводить к его деформации.

5. Дайте развернутый ответ на вопрос.

- 1) When is the ship structure said to be sufficiently strong?
- 2) When is the ship structure said to be sufficiently stiff?
- 3) To what kind of loads is the ship hull subjected?
- 4) Why is it important that the structural material be properly disposed and proportioned?

6. Перескажите текст «Strength of Ships» или составьте диалог по данной теме

5. UNIT 5. Stability

The original stability of a ship is the business of her designers and builders, but the basic principles of stability are important to the seaman for his own safety and that of his ship under the various conditions that may be encountered.

A ship has two kinds of stability, **longitudinal** and **transverse**; the first tends to keep a ship from rolling end over end, the second tends to keep it from **capsizing**. Longitudinal stability is always good enough to present little danger. The knowledge of the transverse stability of any ship, on the other hand, is very important to the seaman in order **to gauge** the amount of roll allowable without danger of capsizing.

Unless acted upon by some external force a ship that is properly designed and loaded, remains upon an even keel, that is the **centerline** of the ship drawn upward from the keel is at right angles to the surface of the water. The force that keeps the ship on an even keel and tends to return it to this position when rolled away is called **buoyancy**, and is the sum of the vertical components of the hydrostatic pressure on the underwater body. It is also equal to the weight of the water displaced by the underwater body. The **force of buoyancy** also keeps the ship **afloat**. It may be overcome, and the ship may sink if too much weight is introduced into the underwater body, as in the case when too many holds or compartments are flooded. The force of buoyancy tending to bring the ship back on an even keel may be overcome and the ship may capsize if too much weight is introduced on one side of the centerline, as when all compartments on one side are flooded. A ship may also capsize when it is **stranded** and the force of buoyancy reduced by the reduction of the hydrostatic pressure on the underwater body.

The foregoing are examples of static forces tending to capsize a ship. The effects of wind and waves are **dynamic forces**. A smaller dynamic force than a static force may be sufficient to overcome the force of buoyancy and to capsize a ship because the effect of a dynamic force depends on the speed with which it is applied as well as on its **magnitude**.

An elementary idea of the forces tending to prevent a ship from capsizing can be obtained from Figs. 1 and 2. In Fig. 2, G represents the center of gravity of the ship. It is the point where the sum of **the moments of all weights** of the ship **with reference to any axis** through this point is equal to zero. Since the loading is usually the same on both sides of the vertical centerline plane the center of gravity usually lies in this plane and, in ships of usual form, near the midship section.

B is the center of pressure of the force of buoyancy and lies at the center of gravity of the **volume of displacement**. When the ship is on an even keel, B is in the vertical centerline plane. When the ship **lists** or rolls B moves to the lower side and a vertical line drawn from B cuts the vertical plane of the centerline. The point M where this line cuts for an **infinitesimal** angle of inclination is called the **metacenter**, and the distance GM is called the **metacentric height**.

Words and Phrases

Stability – остойчивость
 longitudinal stability – продольная остойчивость
 transverse stability – поперечная остойчивость
 to capsize – опрокидываться
 to gauge – измерять, производить измерения
 centerline – осевая линия
 buoyancy – плавучесть
 force of buoyancy – поддерживающая сила
 afloat – на плаву
 to strand – садиться на мель
 dynamic force – динамическая сила, динамическая нагрузка
 magnitude – значение
 moment of weight – момент массы
 with reference to any axis – по отношению к любой оси координат
 volume of displacement – объём водоизмещения
 to list – крениться, накреняться
 infinitesimal – бесконечно малый
 metacenter – метацентр
 metacentric height – высота метацентра

Exercises

1. Переведите следующие термины и словосочетания, выпишите незнакомые слова.

Longitudinal stability, transverse stability, to remain upon an even keel, holds and compartments, danger of capsizing, to tend to capsize a ship, flooded compartments, the reduction of the hydrostatic pressure, the effect of a dynamic force, the center of gravity of the ship.

2. Найдите эквиваленты следующих сочетаний в тексте.

Измерить амплитуду бортовую качку, под прямым углом к поверхности воды, гидростатическое давление, быть равным весу замещаемой воды, поддерживать на плаву, корабль сел на мель, достаточный, чтобы преодолеть поддерживающую силу, силы, препятствующие опрокидыванию судна, объём водоизмещения.

3. Переведите следующие предложения.

1) The center of gravity of the ship is the point where the sum of the moments of all weights of the ship with reference to any axis is equal to zero.

2) Longitudinal stability tends to keep a ship from rolling end over end and transverse stability tends to keep it from capsizing.

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3) In order to gauge the amount of roll allowable without danger of capsizing. The knowledge of the transverse stability of any ship, on the other hand, is very important to the seaman.

4) The force of buoyancy is the sum of the vertical components of the hydrostatic pressure on the ship's underwater body.

5) The force of buoyancy tending to bring the ship back on an even keel may be overcome and the ship may capsize if too much weight is introduced on one side of the centerline, as when all compartments on one side are flooded.

6) Damages connected with the flooding of ship's holds or compartments can result in decrease of her stability, as well as in listing and rolling.

7) The transverse stability is more important than the longitudinal stability.

8) The metacentric height of the ship is the distance between the center of gravity and the metacenter of the ship.

9) The force of buoyancy keeps the ship afloat.

10) The undamaged ship's stability requirements are determined by her floodability requirements.

4. Выполните самостоятельный перевод предложений с русского языка на английский.

1) Обеспечение остойчивости судна является задачей его разработчиков и конструкторов, но общее понятие об остойчивости должен иметь каждый мореход.

2) Поддерживающая сила равна массе воды, вытесняемой подводной частью судна.

3) Судно может затонуть в том случае, если его подводная часть перегружена, например, если затоплено слишком большое количество трюмов и кают.

4) Действие динамической силы зависит от ее величины и скорости воздействия.

5) Судно может опрокинуться, когда садится на мель, так как поддерживающая сила снижается в результате уменьшения давления на подводную часть судна.

6) Динамическими силами называется воздействие внешних факторов, таких как ветер и волны.

7) Остойчивость проявляется только при отклонениях корабля от положения равновесия.

8) Следствием повреждений, связанных с затоплением части отсеков корабля, может быть снижение его остойчивости и получение поврежденным кораблем крена.

9) Остойчивость – способность корабля, выведенного из положения равновесия воздействием внешних сил, вновь возвращаться в исходное положение после прекращения действия этих сил.

10) В зависимости от плоскости наклона различают поперечную и продольную остойчивость.

5. Дайте развернутый ответ на вопрос.

- 1) What kinds of stability has a ship?
- 2) Which of these is more important?
- 3) What is the tendency of the longitudinal and what of the transverse stability?
- 4) What is the name of the force that keeps the ship on an even keel?
- 5) What is the sum of the vertical components of the hydrostatic pressure equal to?
- 6) What force keeps a ship afloat?
- 7) In which cases is the force of buoyancy reduced?
- 8) Give the names of the static forces acting upon the ship hull.
- 9) Give the names of the dynamic forces acting upon the ship hull.
- 10) The characteristics of a force are its magnitude, line of action, and sense. Which of these characteristics makes the force a vector quantity? Give some examples of scalar quantities.
- 11) What is the centre of gravity of a ship?
- 12) In what plane does the centre of gravity lie?
- 13) Where does the centre of pressure of a force of buoyancy lie?
- 14) Suppose that the ship is on an even keel, i.e. the centerline plane is perpendicular to the surface of the water. In which plane does the center of buoyancy lie in that case?
- 15) Does the center of buoyancy remain in the same plane when the ship lists or rolls?
- 16) How is the angle of inclination of a ship designated?
- 17) How is the point M, the metacenter of the ship, obtained when the ship is inclined?
- 18) Which distance is the metacentric height of the ship?

6. Перескажите текст «Stability» или составьте диалог по данной теме.

6. UNIT 6. Building Systems and Their Characteristics

Introduction. Every ship hull is a kind of a box like carrier which when in service, whether it is floating or sailing, is subjected to the different kinds of static and dynamic forces which act transversely, longitudinally and **torsionally** upon the ship hull. Therefore the ship hull must be designed and built in such a way that it can withstand all the stresses caused by these forces. Which of these forces will be **predominant** depends on the size and type of a ship, the cargo it carries, the distribution of weight, the seaway conditions etc.

A ship hull consists of the **transverse members** which provide the transverse strength of the ship, and of the **longitudinal members** which ensure the longitudinal strength of the ship. Besides these there are other building members that provide the **watertightness** of the ship and finally different kinds of fittings and equipment that are required to be fitted on a ship. The transverse and longitudinal members of the ship must be arranged and disposed in such a way that they will ensure the **torsional strength** of the ship hull as well.

Every ship hull must be provided with the basic structural members which are the bearers of the **transverse strength** (ordinary frames, **web frames** or side **transverses**; ordinary beams, **web beams** or deck transverses; floors or bottom transverses) and also with the basic structural members which are the bearers of the **longitudinal strength** (the keel plate, the **centre girder**, side girders, the sheer **strake**, the **deck stringer plate**, and that portion of the **plating** that is at the farthest distance from the neutral axis). Some parts of the ship hull, however, may be built transversely or longitudinally depending upon the size and type of the ship and the rules of the classification societies to which a ship is built. This primarily refers to the stiffening system of the side, deck and bottom plating, which together form the outside plating of the ship hull. The stiffening of the hull plating is closely related to the stiffening of the transverse and longitudinal **bulkheads**, the different kinds of tanks, and also to the inner bottom plating if the ship is provided with a double bottom.

1. The transverse system of building. The side plating is stiffened by the transverse frames, the deck plating by the beams, and the bottom plating by the floors (plate floors or watertight floors).

2. The longitudinal system of building. The side plating is stiffened by the side **longitudinals**, the deck plating by the deck longitudinals, and the bottom plating by the bottom longitudinals.

3. The combination system of building. The side plating is stiffened by the transverse frames, the deck plating by the deck longitudinals, and the bottom plating by the bottom longitudinals.

Building system	Side stiffening	Deck stiffening	Bottom stiffening
transverse	transverse	transverse	transverse
longitudinal	longitudinal	longitudinal	longitudinal
longitudinal	transverse	longitudinal	longitudinal

FIG. 1 A TABLE SHOWING THE CHARACTERISTIC FEATURES OF THE BUILDING SYSTEM

This classification table of the three building systems primarily refers to that part of the ship hull which extends between the fore and after peak, i.e. it refers to the **parallel middle body** of very large ships.

The peaks are generally built in a special transverse system of building **regardless of** the system that is used for the remaining part of the hull. This system has proved to be most convenient for that part of the hull where its form is abruptly changed, its breadth is suddenly reduced, and where a number of auxiliary units and equipment must be placed and fitted.

Words and Phrases

torsionally – крутяще, торсионно
 predominant – преобладающий
 transverse member – поперечный элемент конструкции
 longitudinal member – продольный элемент конструкции
 watertightness – водонепроницаемость, герметичность
 torsional strength – прочность при кручении
 transverse strength – поперечная прочность
 transverse – поперечная балка
 web frame – рамный шпангоут
 web beam – рамный бимс
 longitudinal strength – продольная прочность
 centre girder – центральная балка
 strake – пояс (наружной обшивки)
 deck stringer plate – продольная балка настила
 plating – обшивка
 bulkhead – переборка
 longitudinal – продольный элемент конструкции
 parallel middle body – цилиндрическая часть корпуса
 regardless of – не обращая внимания; невзирая на; не считаясь с

Exercises

1. Переведите следующие термины и словосочетания, выпишите незнакомые слова.

To withstand stresses caused by the forces, to be predominant, the transverse strength of the ship, the longitudinal strength of the ship, to be arranged and disposed in a certain way, watertightness, classification society, the outside plating of the ship hull, to be stiffened by, to extend between the fore and after peak.

2. Найдите эквиваленты следующих сочетаний в тексте.

Судно подвергается различным статическим и динамическим нагрузкам, преобладающая сила, зависит от размера и типа судна, необходимое на судне оборудование, обеспечивать прочность корпуса при кручении, носители поперечной прочности, рамный шпангоут, поперечные балки переборок и днища, комбинированная система строения.

3. Переведите следующие предложения.

1) A ship hull consists of the transverse members which provide the transverse strength of the ship, and of the longitudinal members which ensure the longitudinal strength of the ship.

2) The bearers of the longitudinal strength are the keel plate, the centre girder, side girders, the sheer strake, the deck stringer plate, and that portion of the plating that is at the farthest distance from the neutral axis.

3) The stiffening of the hull plating is closely related to the stiffening of the transverse and longitudinal bulkheads, the different kinds of tanks, and also to the inner bottom plating if the ship is provided with a double bottom.

4) The peaks are generally built in a special transverse system of building regardless of the system that is used for the remaining part of the hull.

5) At the peaks the hull form is abruptly changed because the ship breadth is suddenly reduced.

6) A ship hull consists of the transverse members, longitudinal members and building members that provide the watertightness of the ship and, finally, of different kinds of fittings and equipment that are required to be fitted on a ship.

7) Whether it is floating or sailing, the ship hull is always subjected to the different kinds of static and dynamic forces which act transversely, longitudinally and torsionally upon the ship hull.

8) The watertightness of the ship is provided by different building members of the hull.

9) The side, deck and bottom plating form together the outside plating of the ship hull.

10) If the ship is provided with a double bottom, the inner bottom plating should be closely considered.

4. Выполните самостоятельный перевод предложений с русского языка на английский.

1) То, какие из сил, действующих на судно, будут преобладать, зависит от размера и типа судна, перевозимого им груза, распределения веса, погодных условий и т.д.

2) Различные элементы конструкции обеспечивают водонепроницаемость судна.

3) Продольные и поперечные элементы конструкции должны быть рассчитаны таким образом, чтобы обеспечивать прочность корпуса при кручении.

4) К носителям поперечной прочности относятся: обычные шпангоуты, рамные шпангоуты (бортовые поперечные балки), обычные бимсы, рамные бимсы (палубные поперечные балки), поперечные балки переборок и днища.

5) Внешняя обшивка корпуса судна состоит из обшивок бортов, палубы и днища.

6) Если судно имеет комбинированную систему строения, то бортовая обшивка укреплена поперечными шпангоутами, обшивка палубы – продольными элементами конструкции, а обшивка днища – продольными элементами конструкции днища.

7) Поперечная система строения считается максимально подходящей для этой части судна.

8) Корпус судна должен быть спроектирован и построен таким образом, чтобы выдерживать нагрузки, вызванные действующими на него силами.

9) Каждый корпус судна должен иметь основные структурные элементы, обеспечивающие его поперечную и продольную прочность.

10) От размера и типа судна, а также от устава классификационных обществ, согласно которому строится судно, зависит то, какую систему необходимо использовать для построения того или иного судна.

5. Дайте развернутый ответ на вопрос.

1) To what kind of forces is the ship hull subjected?

2) In what direction do the forces act upon the ship hull?

3) What are the basic structural members that provide the transverse strength of the ship?

4) What are the basic structural members that ensure the longitudinal strength of the ship?

5) Explain the table which shows the characteristic features of the three building systems.

6) What system of building is generally used for the fore and after peaks?

7) What is the characteristic form of the peaks?

6. Перескажите текст «Building Systems and Their Characteristics» или составьте диалог по данной теме.

7. KEYS

Unit 1. Type of Ships and Boats

1) How can ships in general can be classified by their use?

They can be classified by their use as Men of War or Warships and Merchant ships.

2) Why do certain types of warships tend to become obsolete or even don't appear?

Because of the invention of new weapons or the development of new tactics.

3) According to what criteria may the ships be classified?

They may be classified according to the following criteria:

a) If they are used for the trade, they are merchant ships and if they are used for belligerent purposes, they are warships.

b) If they are intended for the service on the sea, they are sea-going ships, and if they are intended for the service on the rivers, they are river boats.

c) If they carry the cargo, they are cargo ships, and if they transport passengers, they are passenger ships.

d) The type of cargo ships, they carry, such as: general cargo ships, bulk carriers, ore carriers, bulk/ore carriers, dry cargo ships, OBO ships, refrigerated cargo ships, containerships, oil tankers, liquefied gas carriers, LNG carriers etc.

e) The type of machinery they use for their propulsion, such as steamships, motorships and nuclear ships.

4) The ship may be built perpendicular or parallel to the water.

a) How are sea-going ships built?

b) How are river boats built?

a) Sea-going ships are built perpendicular to the water, i.e. their fore and aft line is perpendicular to the water, they are built and launched endwise.

b) The river boats are built parallel to the water, i.e. they are built broad-side and launched sideways.

5) Explain the following terms: the liners, the coasters.

The liners are the ships which keep a definite route.

The coasters are the ships whose route is along a coast.

6) The ship propelling machinery may be of different type.

Specify the types of ship propelling engines.

They are:

a) reciprocating steam engines,

b) steam turbines,

c) marine diesels (diesel engines),

d) gas turbines.

7) Which propelling machinery is of recent years?

It is the nuclear power plant.

8) What types of boats do you know?

I know the following types of boats: rowing boats, sailing boats, fishing boats, motorboats, life boats etc.

Unit 2. Tonnage of Ships

1) What is the displacement of a ship?

It is the quantity or volume of water displaced by a ship.

It is equal to the weight of the ship.

2) How can the displacement of a ship be expressed?

It may be expressed either in cubic feet or in tons.

3) What kinds of tonnage do you know, and how they are applied?

I know deadweight tonnage, gross register tonnage and register tonnage. The deadweight tonnage is used for cargo ships and the gross and net register tonnage are used for passenger ships.

4) What spaces are deducted from the gross register tonnage to obtain the net register tonnage?

From the gross register tonnage are deducted such spaces, as may have no earning capacity, such as: machinery spaces, engine rooms, officers and crew's quarters, alley spaces, spaces used in steering, etc.

Unit 3. Dimensions of a Ship

1) Which length is called the designer's length and what is its abbreviation?

The designer's length is the length between perpendiculars. Its abbreviation is Lpp.

2) What do you call the length from the extreme point of the stem to the extreme point of the stern?

It is the length over all.

3) What measurements are used for the breadth of the ship?

There are two measurements:

a) Breadth moulded which is the breadth of the ship at its widest point measured to the outside surface of the frames.

b) Breadth extreme which is the breadth measured to the outside surface of fenders or plating.

4) Which distance is called the depth of the ship?

It is the vertical distance from the keel at the centreline to the top of the deck beams of the highest complete watertight deck measured at the side.

5) What do you call the vertical distance from the water to the weather deck edge?

It is the freeboard.

6) What is the draught of a ship?

It is the vertical distance from the surface of the water to the bottom of the ship.

7) What do you call the draught measured

a) at or near the stem?

b) At or near the sternpost?

a) The draught measured at or near the stem is called the draught forward.

b) The draught measured at or near the sternpost is called the draught aft.

8) Give a definition of the mean draught.

The mean draught is the mean value of the draught forward and aft.

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9) What do you call a ship designed to have the same forward and aft?

It is an even keel ship.

10) Explain the statement: The ship is out of trim.

The ship is said to be out of trim when the draught forward and draught aft are not equal.

11) Where do we indicate the maximum draught to which merchant ships may be loaded?

It is indicated on the side of the ship at the midship section.

12) What is the name of the mark which indicates the maximum draught?

Its name is the Plimsoll mark.

Unit 4. Strength of Ships

1) When is a ship's structure said to be sufficiently strong?

It is said to be sufficiently strong if it can support all the fixed loads of its machinery, fittings and equipment and all the cargo loads, and if it can withstand all the hydrostatic and hydrodynamic loads which can be imposed upon it.

2) When is a ship's structure said to be sufficiently stiff?

It is said to be sufficiently stiff if, under any of the service loads, it does not flex or deform unduly.

3) To what kind of loads is a ship hull subjected?

It is subjected to vertical and lateral bending and twisting all at the same time.

4) Why is it so important that the structural material be well disposed and proportioned?

It is so important because the following requirements in building a ship must be satisfied:

- the ship hull must have minimum weight;
- the ship must be built at minimum cost, and
- the ship must perform all its functions acceptably.

Unit 5. Stability

1) What kinds of stability has a ship?

A ship has two kinds of stability, longitudinal and transverse.

2) Which of them is more important?

The transverse stability is more important than the longitudinal stability.

3) What is the tendency of the longitudinal and what of the transverse stability?

The longitudinal stability tends to keep a ship from rolling end over end. The transverse stability tends to keep the ship from capsizing.

4) What is the name of the force that keeps the ship on an even keel?

Its name is the force of buoyancy.

5) To what is the sum of the vertical components of the hydrostatic pressure equal?

The sum of the vertical components of the hydrostatic pressure is equal to the weight of the water displaced by the underwater body.



6) What force keeps the ship afloat?

The force of buoyancy keeps the ship afloat.

7) In which cases is the force of buoyancy reduced?

It is reduced if too much weight is introduced into the underwater body or on one side of the centerline as well as if the ship is stranded and the force of buoyancy is reduced by the reduction of the hydrostatic pressure acting on the underwater body.

8) Give the names of the static forces acting upon the ship hull.

They are the force of buoyancy and the weights on the ship.

9) Give the names of the dynamic forces acting upon the ship hull.

They are the force of wind and waves.

10) The characteristics of a force are its magnitude, line of action and sense.

Which of these factors makes the force a vector quantity? Give some examples of scalar quantities.

A force is a vector quantity because besides its magnitude it has a line of action and a sense. Scalar quantities are: mass, time, numbers, etc.

11) What is the center of gravity of a ship?

The center of gravity of a ship is the point where the sum of the moments of all the weights of the ship with reference to any axis through this point is equal to zero.

12) In what plane does the center of gravity lie?

It lies in the longitudinal vertical centerline plane.

13) Where does the center of pressure of the force of buoyancy lie?

It lies at the center of gravity of the volume of displacement.

14) Suppose that the ship is on an even keel, i.e. the centerline plane is perpendicular to the surface of the water. In which plane does the center of buoyancy lie in that case?

It lies in the vertical longitudinal centerline plane.

15) Does the center of buoyancy remain in the same plane when the ship lists or rolls?

No, it doesn't.

16) How is the angle of inclination of a ship designated?

It is designated by the Greek letter phi.

17) How is the point M, the metacenter of the ship, obtained when the ship is inclined?

It is obtained by drawing a vertical line from B1 which cuts the vertical plane of the centerline.

18. Which distance is the metacentric height of the ship?

It is the distance between the center of gravity and the metacenter of the ship.

Unit 6. Building Systems and Their Characteristics

1) To what kind of forces is a ship hull subjected?

It is subjected to the different kinds of static and dynamic forces.

2) In what direction do these forces act upon the ship hull?

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They act transversely, longitudinally and torsionally.

3) What are the basic structural members that provide the transverse strength of the ship?

They are ordinary frames, web frames or side transverses; beams, web beams or deck transverses; and floors or bottom transverses.

4. What are the basic structural members that ensure the longitudinal strength of the ship?

They are the keel plate, the centre girder, side girders, the sheer strake, the deck stringer plate, and that portion of the plating that is at the farthest distance from the neutral axis.

5) Explain the table which shows the characteristic features of the three kinds of building systems?

The table shows the characteristic feature of the three kinds of building systems. When the ship is built according to the transverse system, the side plating is stiffened by the transverse frames, the deck plating by the beams, and the bottom plating by the floors which may be plate floors or watertight floors. If the longitudinal system of building is applied the side, deck and bottom plating are stiffened by the side, deck and bottom longitudinals. In case of the combination system of building the bottom and deck plating are stiffened by the bottom and deck longitudinals while the side plating is stiffened by the transverse frames which may be ordinary or web frames.

6) What system of building is generally used for the fore and after peak?

A special transverse system is used for the peaks.

7) What is the characteristic form of the peaks?

At the peaks the hull form is abruptly changed because the ship breadth is suddenly reduced.

БИБЛИОГРАФИЧЕСКИЙ СПИСОК

1. Грамматика английского языка: Пособие для студентов педагогических институтов и университетов / В.Л. Каушанская, Р.Л. Ковнер, О.Н. Кожевникова, Е.В. Прокофьева. - М.: «Страт», 2000. - 319 с.
2. Снежко Н.А. Английский язык для судовых механиков: учебное пособие / Н.А. Снежко, А.Д. Шерешевская, В.М. Ласточкин. - М.: Мортехинформ-реклама, 1989. - 200 с.
3. Shipbuilding 1989-1998