Министерство образования Республики Беларусь

БЕЛОРУССКИЙ НАЦИОНАЛЬНЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

Кафедра английского языка № 2

М.А. Чумаков
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SHIPBUILDING

Кораблестроение

Часть 2

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в 2 частях

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UNIT I
WATER VESSELS

Ex. 1. Read and translate the words. Include them into your vocabulary:

Warfare, seacoast, paddle wheel, soybean, machinery, liquid, vessel, dry bulk carrier, zipper, canoe, steam, propeller, cargo, prosperity, bunker fuel, craft, barge, objective, aborigine, conquistador, strait, row, propulsion, navy, deck, hovercraft, pusher-prop fan, petroleum, power, heat, provision, garbage, hull, engine, rudder, regulation, keel, rib, shape, compartment, boiler, bow, stern, wire, pipe, framework, shipway, superstructure, valve, pier, trial, bulkhead, gear, shaft, motor-ship, screw, funnel, winch, mooring line, runway, timber, stem, hatch, butt, seam, poop, coaming, bulwark;

To haul, to conquer, to brave, to cripple, to refine, to accomplish, to generate, to dispose, to adjust, to prefabricate, to assemble, to weld, to christen, to slide, to deliver, to trap, to roll, to pitch, to rock, to descend, to ascend, to bobble, to spin, to jut, to hinge, to exhaust, to pump, to grease;

Inland, jet, raw, marine, merchant, inboard, perishable, complicated, enormous, watertight.

Ex. 2. Insert the right word:

Braved, seacoast, merchant, crippled, liquids, propulsion, canoe, strait, vessels, conquered, inland, paddle wheels, cargo, to haul, petroleum, non-perishable, prosperity, propellers.

1. Well-developed economy guarantees the … of the country. 2. … transportation is made by … … . 3. … and other … are carried by tankers. 4. The Medieval sailors … the unknown waters and … new lands. 5. … is probably the first type of the boat. 6. … fruit by sea it must be … . 7. For the … of the first steamboats …

…, later replaced by …, were used. 8. The ship was badly … in the battle. 9. In summer time a lot of people prefer to spend their vacation at the … or near … rivers and lakes. 10. The … of Dover is the narrowest part of the English Channel.

Ex. 3. Change the words of italic type with their synonyms from your active vocabulary:

1. The storm *damaged* the ship greatly. 2. For the *moving* of an *air-cushion vessel* a special *propeller* is used. 3. The *aims* of the *war program* were *fulfilled* with the help of the *battle fleet*. 4. Heavy *weights* are *carried* by *sea transport*. 5. Australian *natives* may be considered the inventors of ocean going *ships*. 6. *Trade* fleet is being developed in our country nowadays. 7. Bulky *equipment* was stored on deck. 8. The country's *well-being* has always been dependant on the development of its fleet. 9. The transportation of *oil* demands special *ships* called tankers. 10. A small troop of Spanish *conquerors,* armoured much better than Indian tribes, soon won control of much of their land.

Ex. 4. Define in one word:

a) one of a horizontal surfaces dividing the ship's hull;
b) a straight line of smth or smb;
c) form or contours of an object;
d) a plate or screen preventing the passage of liquid or gas;
e) a rule, law or order;
f) a vessel being moved by diesel engine;
g) a large flat piece of metal or wood that steers a ship;
h) a rope being used to tie a vessel at a pier.

Ex. 5. Translate into Russian:

mean of transportation
inland waterways
throughout history
to haul copper to
be as important as ever
giant tankers
country's prosperity and strength
cargo ships
the world's leading trading nation
promise of adventure
to bring in food and raw materials
to win control
a large merchant marine
the first Pilgrim settlers
warships and naval vessels
sailing vessels
a matter of size
steam-powered ships
a horse-drawn boat
ocean going craft
a combination of two
to drive a paddle wheel
a mechanism for conducting warfare
to produce the steam
a refined type of petroleum
an inboard water jet
internal combustion engines
in shallow draft areas
large quantities of goods
a fraction of the time

Ex. 6. Read and translate the text:

TEXT 4A
SHIPS AND BOATS

Ship is one of the oldest and most important mean of transportation. Every day, thousands of ships cross the oceans, sail along seacoasts, and travel on inland waterways. Ship transport is the process of moving people, goods, etc. by barge, boat, ship or sailboat over a sea, ocean, lake, canal or river. This is frequently undertaken for purposes of commerce, recreation or military objectives.

Trade among countries depends heavily on ships. For example, ships carry wheat from Canada to Germany and machinery from Germany to Chile. They haul copper from Chile to Japan and Japanese automobiles to the United States. Ships

transport American corn to Ethiopia, coffee from Ethiopia to France, and French plastics to Canada.

Although relatively slow, modern sea transport is a highly effective method of transporting large quantities of non-perishable goods. Transport by water is significantly less costly than transport by air for trans-continental shipping.

Many kinds of ships are used to carry the world's trade. Giant tankers haul petroleum, soybean oil, wines and other liquids. Refrigerator ships carry fresh fruit, meat, and vegetables. Vessels called dry bulk carriers haul such cargoes as grain, ore, and sand. General cargo ships transport everything from airplane engines to zippers. Passenger liners carry travelers across the oceans and vacationers on cruises to the Mediterranean and Caribbean seas and other warm areas.

Ship transport was frequently used as a mechanism for conducting warfare. Military use of the seas and waterways is covered in greater detail under navy.

The first craft were probably types of canoes cut out from tree trunks. The colonization of Australia by the Australian aborigines provides indirect but conclusive evidence for the latest date for the invention of ocean going craft; land bridges linked southeast Asia through most of the Malay Archipelago but strait had to be crossed to arrive at New Guinea, which was then linked to Australia. Ocean going craft were required for the colonization to happen.

Early sea transport was accomplished with ships that were either rowed or used the wind for propulsion, and often, in earlier times with smaller vessels, a combination of two. Also there have been horse-powered boats, with horses on the deck providing power.

For several thousand years, people have gone down to the sea in ships. They have been drawn by the mysteries of the sea and by its promise of adventure. More important, people have sailed the seas to explore, to settle, to trade, and to conquer. In 1492, Christopher Columbus braved the unknown waters of the Atlantic Ocean in three small sailing ships and reached the New World.

During the 1500's, Spanish ships carried conquistadors (conquerors) to Latin America. The conquistadors soon won control of much of the region for Spain. An old trading ship called the *Mayflower* brought the first Pilgrim settlers to North America in 1620. From the 1600's to the 1800's, big sailing ships called *East Indiamen* carried silks, spices, and other riches from the Far East to Europe. During the mid-1800's, steam-powered ships, using a steam engine to drive a paddle wheel or propeller to move the ship, began to replace sailing vessels. The world quickly became smaller as steamships crossed the seas in a fraction of the time that sailing ships needed. Thus, ships have brought countries and peoples closer and made them dependent economically on one another. The steam was produced using wood or coal. Now most ships have an engine using a slightly refined type of petroleum called bunker fuel. Some specialized ships, such as submarines, use nuclear power to produce the steam.

Recreational or educational craft still uses wind power, while some smaller craft uses internal combustion engines to drive one or more propellers, or in the case of jet boats, an inboard water jet. In shallow draft areas, such as Everglades, some crafts, such as the hovercraft, are even propelled by large pusher-prop fans.

Throughout history, nations have become rich and powerful by controlling the seas in war and peace. When countries have lost that control, they have declined. Today, ships are as important as ever to a country's prosperity and strength. The United States, the world's leading trading nation, depends largely on ships for its imports and exports. The economics of Great Britain, Japan, Germany, and many other countries would soon be badly crippled if there were no ships to bring in food and raw materials and to carry out manufactured goods. All the great trading nations try to have a large merchant marine. A merchant marine consists of the commercial, or merchant, ships of the country. Warships and naval vessels form the country's Navy; vessels for sport and rest are called pleasure boats.

The difference between a ship and a boat is chiefly a matter of size. Large oceangoing vessels are called ships; all other craft are called boats.

Ex.7. Answer the questions:

1. Why can we say that trade among countries depends heavily on ships? 2. What kinds of ships are used to carry the world's trade? 3. What has made people go down to the sea in ships for several thousand years? 4. What important event happened in 1492? 5. What is the *Mayflower* and why does she take so significant place in American history? 6. Try to explain what ships were called *East Indiamen*. 7. Why can it be stated that the world became smaller in the mid-1800s? 8. What did the invention of steamships resulted in? 9. Why has it always been important for a country to control seas? 10. What is the difference between a ship and a boat? 11. What is ship transport? 12. What purposes are ships undertaken for? 13. What was probably the first craft in the world? 14. What ships was early sea transport accomplished with? 15. When were the first steam ships developed? 16. How was the steam to move the ship produced in the past and how is it produced nowadays? 17. What are the advantages of shipping transport in comparison with other means?

Ex. 8. Agree or disagree with the following statements. Give grounds to your answer:

1. Ship is rather new mean of transportation. 2. Trade among countries depends heavily on ships. 3. General cargo ship is the only type of ships being used to carry the world's trade. 4. Ships have made countries dependent economically on one another. 5. Today, ships are as important as ever to a country's prosperity and strength. 6. Nowadays, the great trading nations pay no attention to the development of a large merchant marine. 7. Commercial, or merchant, ships form the country's Navy. 8. All the water vessels are called ships.

Ex. 9. Explain why:

a) the colonization of Australia by the aborigines provides conclusive evidence for the latest date for the invention of ocean going craft;
b) wind power for moving a ship is still used nowadays;
c) modern sea transport is a highly effective method of transportation.

Ex. 10. Complete the sentences translating the missing parts into English:

1. Ship transport is undertaken *для коммерческих, оздоровительных или военных целей.* 2. The first craft were probably types of canoes, *которые вырезались из древесных стволов.* 3. Early sea transport was accomplished with ships, *которые использовали для движения либо весла, либо ветер.* 4. Ship transport was a mechanism *ведения военных действий*. 5. The first steam ships *использовали гребное колесо или винт* to move the ship. 6. Some craft, *например суда на воздушной подушке*, are even propelled by *большими пропеллерами.* 7. *Транспортировка по воде значительно дешевле для трансконтинентальных перевозок,* than transport by air.

Ex. 11. Translate into English:

1. Корабли позволили людям пересекать океаны, плавать по морям и пользоваться водными путями внутри страны. 2. Это оборудование привозят в Чили из Германии. 3. Исследователей всегда влекли тайны моря. 4. В середине XIX века пароходы быстро вытеснили парусные суда. 5. Эти страны экономически зависят друг от друга. 6. В истории страны всегда становились богатыми и мощными державами, если они обладали контролем над морями. 7. Как в военное, так и в мирное время флот представляет большую важность для процветания страны. 8. Суда торгового флота перевозят продукты питания, сырье и промышленные товары. 9. Боевые корабли составляют военно-морской флот страны.

Ex. 12. Define the main topic and idea of the text, split it into the logical parts, make up the plan of the text.

Ex. 13. Abstract the text.

Ex. 14. Read the text and answer the questions below:

TEXT 1B
SHIP STRUCTURE

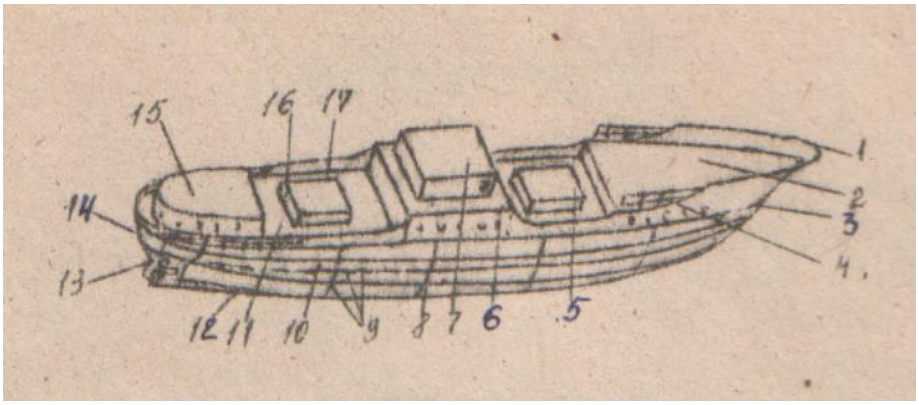
The chief parts of a ship are (1) the hull, (2) the engines, (3) the propellers, and (4) the rudder.

The hull is the watertight shell of a ship. It is divided into a number of horizontal surfaces called decks. Bulkheads are walls built between the decks, forming compartments. Each compartment has special doors that, when closed, make it watertight. If water floods one compartment because of an accident, closing the doors will trap the water there and prevent it from flooding other compartments. Watertight compartments enable a ship to float even with a hole in its hull.

The deck at the top of the hull is called the main deck. Several more decks may be above it. All the structures above the main deck make up the superstructure.

Hulls have a pointed bow so they can knife swiftly through the water. Most hulls also have a rounded stern, which helps the water close smoothly behind as the ship cuts through the water. The overall shape of a hull is designed to make the ship as stable (steady) as possible. A ship must not roll (rock from side to side) or pitch (rock from front to back) too much. Most modern ships also use stabilizing systems to reduce rolling. One such system has a horizontal underwater fin on each side of the hull. The fin moves upward on the descending side of the ship and downward on the ascending side and so reduces the roll.

To increase stability further, ships carry extra weight called ballast. Without ballast, an empty cargo ship would bobble about in the ocean like a cork. Most ships use seawater as ballast. As a ship takes on cargo, the ballast water is pumped out.



Pic.1. Elements of Hull Structure: 1 – bow; 2 – forecastle; 3 – stem; 4 - life-rails; 5 – hatch cover; 6 – bridge; 7 – wheel house; 8 – butt; 9 – seams; 10 – side; 11 – upper deck; 12 – bottom; 13 – sternpost; 14 – stern; 15 – poop; 16 – hatch coaming; 17 – bulwark

The engines of most ships are steam turbines, gas turbines, or diesel engines. The largest and fastest ships have steam turbines. Steam produced in the boilers spins the bladed wheels of the turbine. The turbine, through a series of gears (toothed wheels), drives the propeller shaft and makes the propeller revolve. On turboelectric ships, the turbine turns a generator that produces electricity for a motor. The motor, in turn, drives the propeller. Almost all merchant ships use oil as the fuel to heat the boilers that create the steam. On nuclear-powered ships, a nuclear reactor creates the steam. Many of the most advanced ships have gas turbines. Gas turbines work much like steam turbines but use hot gases instead of steam.

Vessels propelled by diesel engines are called motor-ships. They have either geared-drive or diesel-electric machinery. On a geared-drive ship, the engine works through gears to turn the propeller. On a diesel-electric ship, the engine turns a generator that supplies current to an electric motor connected to the propeller shaft. The propellers, also called screws, move a ship through the water. The engine turns a shaft that juts out underwater from the stern. The propeller is bolted to the end of the shaft. Most propellers have four blades. As a propeller turns, it screws itself

through the water and so pushes the ship forward. Most small ships have one propeller. Many larger vessels have two propellers, and very big ships have four. Additional screws increase a ship's power and make the vessel easier to maneuver. For example, a twin-screw ship can be swung around quickly by going forward on one propeller and backward on the other.

The rudder is a large flat piece of metal that steers a ship. It is hinged to the stern and so can be swung like a door. The rudder is connected to the helm (steering wheel) on the ship's bridge. When the sailor at the helm turns the wheel to the right, the rudder moves to the right, causing the stern to swing left and the bow to swing right. When the helm is turned to the left, the rudder and bow swing to the left.

Other parts and equipment of a ship include funnels (smokestacks) to discharge smoke and exhaust fumes, an anchor on the left and right sides of the bow, and enough lifeboats to hold all persons on board. Modern ships have power-driven winches to raise or lower the anchors and to bring in or let out the mooring lines used to tie vessels at a pier. Power-driven winches also operate the cranes for loading and unloading cargo. Modern ships also have high-speed pumps to pump out ballast water or to pump up seawater in case of fire. Radiotelegraph equipment keeps ships in constant touch with the rest of the world.

1) What is the purpose of special doors that each compartment has?
2) What does superstructure include?
3) What defines the bow and stern shape?
4) Describe the purpose and principle of a stabilizing system.
5) How can seawater be used inboard the she ship?
6) What is the difference between steam turbines, gas turbines and diesel engines?
7) What are the main types of motor-ships?
8) What is the rudder and what for does it serve?
9) What other parts and equipment are integrated into the ship structure?

Ex. 15. Speak on the topic "Ship Structure".

Ex. 16. Read the text and speak on the ship classification.

TEXT 1C
CLASSIFICATION OF SHIPS

A great variety of ships may be classified into two main groups *(table 2):*

a. civil ships;
b. war ships.

All they may be classified according to the following features:

a) place of navigation;
b) hull material;
c) propulsion system;
d) propulsion.

According to the place of navigation ships may be divided into:

1. ocean and sea-going ships,
2. river and lake ships and
3. coasters.

According to the hull material ships may be: wooden, steel, reinforced, from aluminum alloys, plastic and compound.

Referring to propulsion system ships are divided into two groups:

1. non-propelling ships,
2. self-propelled ships.

The first group, for instance, comprises barges, sailors. The second is represented by a) steamships; b) motorships (equipped with internal combustion engine); c) electric propulsion ships and d) nuclear propulsion ships.

According to propulsion ships are divided into floating, gliding, hydrofoil craft and hovercraft (air-cushion ships).

A: Classification of Civil Ships (table 1):

According to the destination of ships they are classified into:

1. transport ships:
    1) passenger ships,
    2) cargo-carries, ore freighters:
        a) lumber-carries, ore-carries, bulk carries, colliers.
        b) tankers;
    3) cargo-passenger ships and

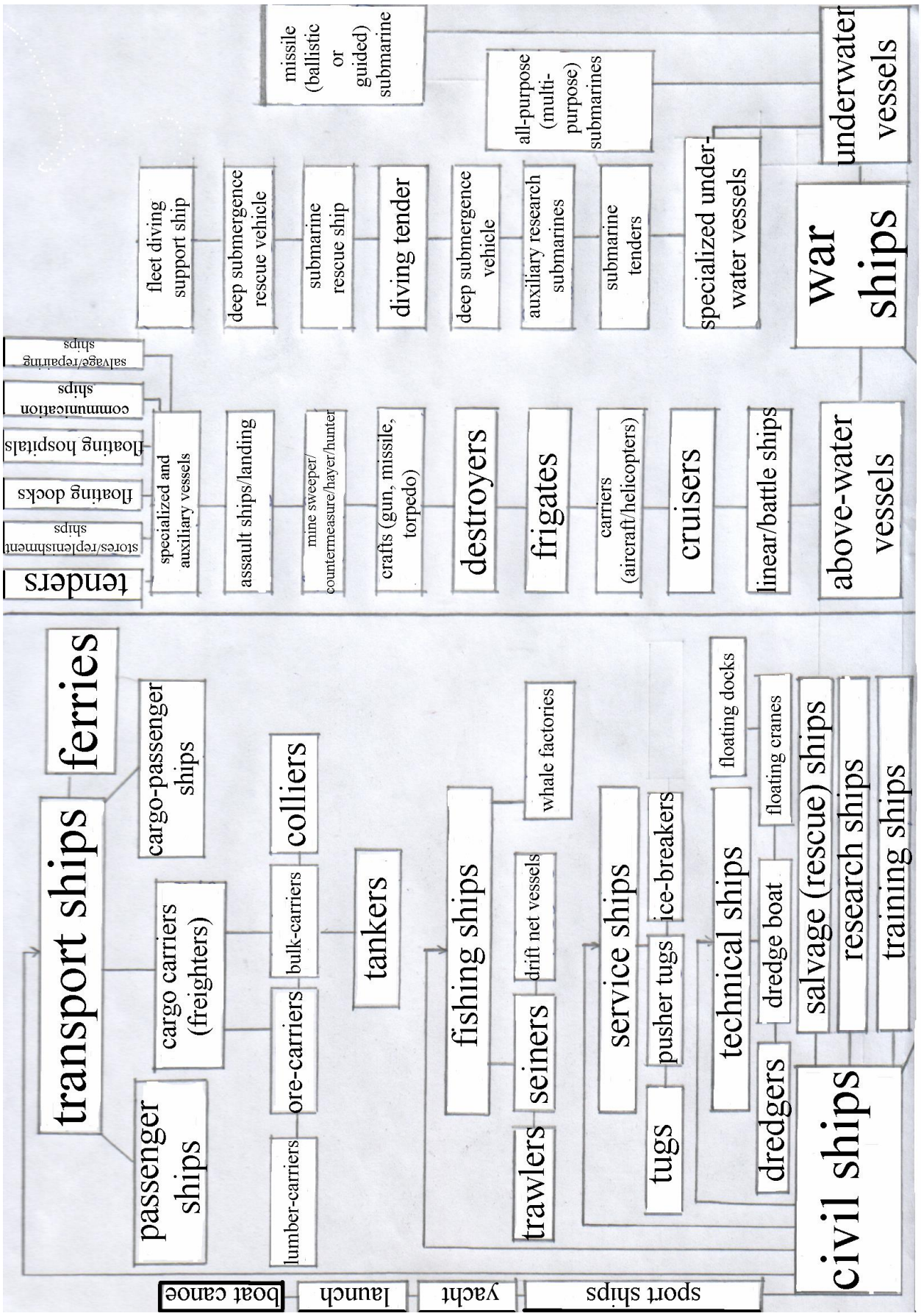


Table 1: Civil and War Ships

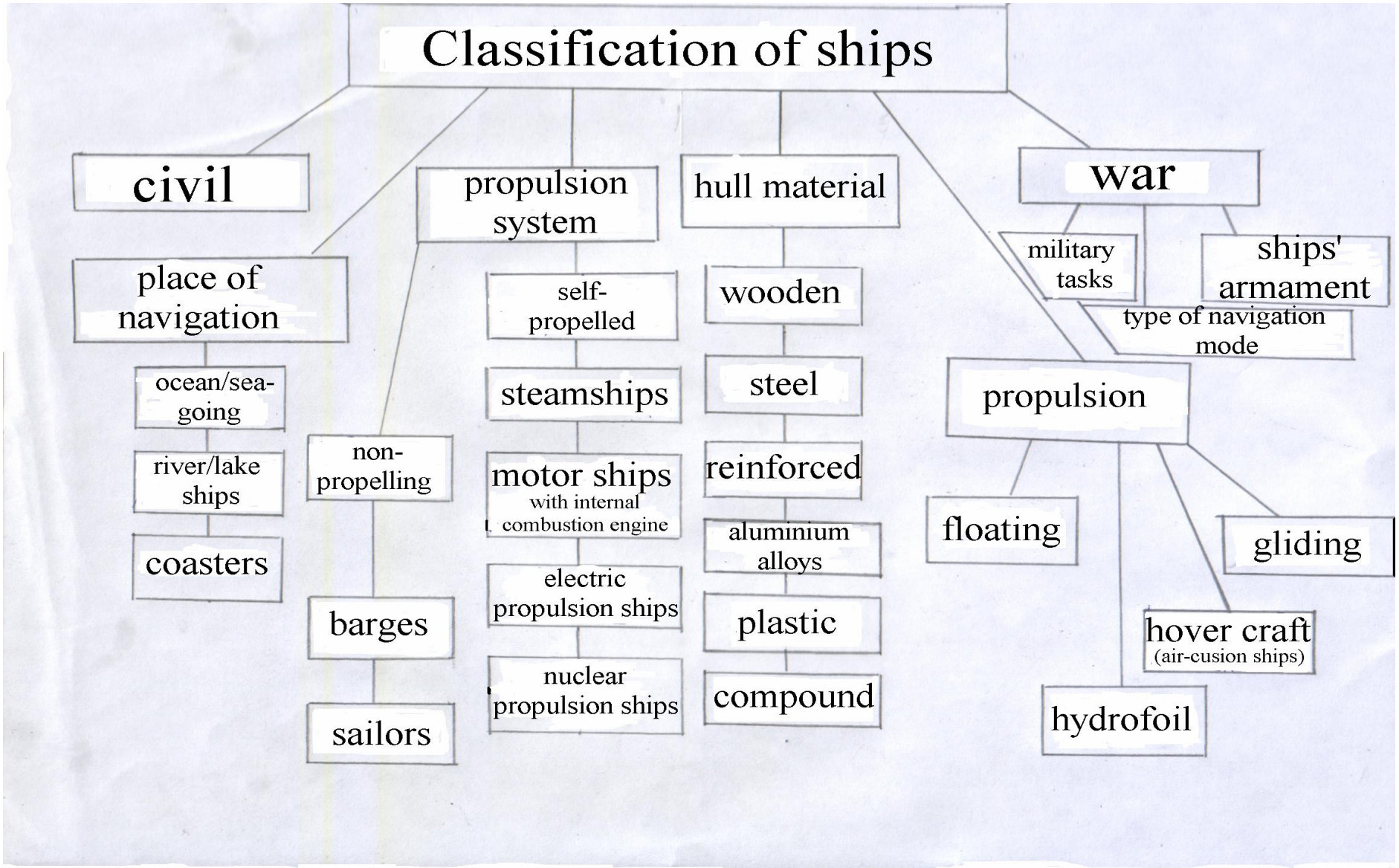


Table 2: Different ways of ship classification

4) ferries.

2. Fishing ships
   1) trawlers, seiners, drift net vessels,
   2) whale factories.
3. Technical ships (Dredgers, dredge boat, floating cranes, floating docks, etc.)
4. Service ships (Tugs, pusher tugs, ice breakers, etc.)
5. Salvage ships (Rescue ships).
6. Research ships.
7. Training ships.
8. Sport ships (yacht, launch, boat canoe).

B: Classification of War Ships (table 1):

Warships are, first of all, classified according to their position relatively to water surface while moving: underwater and above-water vessels. Further classification can be realized from the point of view of military tasks, type of navigation mode and ships' armament.

Underwater vessels cover submarines of all types. They include Missile (Ballistic or Guided) Submarines, All-purpose (or Multi-purpose) Submarines and specialized underwater vessels, namely: Submarine Tenders, Auxiliary and Research Submarines, Deep Submergence Vehicle, Diving Tender, Submarine Rescue Ship, Deep Submergence Rescue Vehicle and Fleet Diving Support Ship.

According to the engine-type all the submarines are divided into nuclear-powered and conventionally-powered (diesel) ones.

Above-water vessels include

- Linear (Battle-) Ships;
- Cruisers (gun and missile ones);
- Carriers (for aircraft and helicopters);
- Frigates (also equipped with guided missiles and helicopters);
- Destroyers (guided missile vessels, as well);
- Crafts (gun, missile and torpedo ones);
- Mine Sweeper (Countermeasure, Layer and Hunter) Ships;
- Assault (Landing) Ships (including mechanized, amphibious and air cushion craft);
- Specialized and auxiliary vessels (tenders, degaussing ships, ammunition ships, stores and replenishment ships, tankers, floating docks, icebreakers, research and instrumentation ships, communication ships, tugs, floating hospitals, lighters (barges), training, support, light, salvage and repairing ships, barracks craft, etc.).

Patrol ships can be represented in any class of above-mentioned ships.

Some large vessels, such as Multi-purpose Aircraft Carriers and Guided Missile Cruisers are nuclear-powered.

Ex. 17. Match the words. Pay attention to the pronunciation the ships:

1. steamships	a) плавучие краны
2. ore freighters	b) траулеры
3. bulk carriers	c) ракетная субмарина
4. collier	d) буксир
5. ferries	e) крейсер
6. trawlers	f) глубоководное судно
7. whale factories	g) плавучие доки
8. dredgers	h) перевозчик грузов
9. floating cranes	i) минный тральщик
10. tug	j) буксир-толкач
11. pusher tug	k) эскадренный миноносец
12. floating docks	l) землечерпательные судна для углубления дна
13. ice breaker	m) пароходы
14. missile submarine	n) ледокол
15. deep submergence vehicle	o) паромы
16. cruiser	p) угольщик
17. carrier	q) китобойное судно(флотилия)
18. destroyer	r) грузовое фрахтовое судно
19. mine sweeper	s) объёмное транспортное судно, грузоперевозчик

Ex. 18. Complete the sentences:

According to	place of navigation;	may be	classified into	nuclear-powered and conventionally-powered (diesel) ones;
	hull material;	/		
	propulsion system;	ships		non-propelling and self-propelled ones;
	propulsion;	\		
	destination;	are		
	position relatively to water surface;		divided into	underwater and above-water vessels;
Referring to	engine type			transport, fishing,
			considered to be	technical, service, salvage, research, training and sport ships;
				wooden, steel, reinforced, plastic and compound ships;
				ocean ships, river ships and coasters;
				floating, gliding, hydrofoil craft and hovercraft ships.

Ex. 19. Match the name of the ship with a proper type of vessels:

1. mine sweeper ship	a) transport ship
2. seiner	b) fishing ship
3. ice breaker	c) technical ship
4. tug	d) service ship
5. deep submergence rescue vehicle	e) rescue ship
	f) sport ship
6. cruiser	g) submarine
7. destroyer	h) war vehicle
8. tanker	
9. floating crane	
10. yacht	
11. carrier	

Ex. 20. Speak on the topic: "Classification of ships".

UNIT II

PASSENGER SHIPS

Ex. 1. Read and translate the words. Include them into your vocabulary:

Accommodation, cruising speed, car ferry, foil, hydrofoil, flare, flarecraft, body, lounge, drag, ground effect, fan, thrust, watch, kit, estuary, catamaran, sovereign, strait, Chunnel, schedule, horsepower, capacity, displacement, forerunner, priority, significance, review;

Switch, lie, dominate (over), admit, cease, pierce, resume, handle, abolish, trace, yield;

Afloat, kit-built, marshy, smart, urgent, notable, inferior

Ex.2. Insert the right word:

Fans, pierce, hydrofoil, afloat, car ferry, admit, dominated, switch, marshy, flarecraft, watch, drag, bodies.

1. Drivers can use a … to cross the channel. 2. The radio signal is poor. Let's … to another wave. 3. A … is the fastest and rather comfortable way of sea journey. 4. The ¾ of earth surface is covered with large … of water. 5. The huge transatlantic liner … over the rest ships in the harbor. 6. The hovercraft and its high speed variant, the … , are propelled with large … . 7. The … garbage is a serious … for the boat moving. 8. We must … that in … areas it's much more convenient to use hovercrafts than any other vessels. 9. The boat was moving at such a speed that it seemed to … the waves. 10. The … noticed the coming danger immediately.

Ex. 3. Change the words of italic type with their synonyms from your active vocabulary:

1. The development of hovercrafts as cross-channel vessels was *stopped* with the Chunnel construction in 2002. 2. The United Kingdom of Great Britain and Northern Ireland *is situated* on the British Isles. 3. The upper-class *sitting room* on this liner is very spacious and comfortable. 4. The ability of the structure to resist the *side pressure* was also taken into account. 5. Buying a ticket provides you *seat* and service. 6. The Great Lakes are the natural reservoirs containing the largest *quantities* of water in North America. 7. This old boat is still *aswim*. 8. It is *acknowledged* that the *boggy* areas in the south of Belarus are the lungs of the region. 9. River *deltas* have always been a preferable place for settlement. 10. The *double-hulled boat of ready-made parts* is one of the most popular variant of a pleasure vessel.

Ex. 4. Define in one word:

a) a big air propeller using in hovercrafts;
b) the time period when a part of crewmen is responsible for the ship operation while the others are having a rest;
c) something which can be assembled of ready-made parts;
d) moving on the water surface;
e) a vessel for transporting vehicles along and across rivers, channels, bays, etc.
f) horizontal or side pressure;
g) a high-speed vessel, which raise itself on special foils over the water surface while moving;
h) a high-speed vessel on the air cushion.

Ex. 5. Translate into Russian:

to stress passenger comfort
to switch from sails to steam power
the fastest ocean liner afloat
because of a lack of passengers

to offer the best accommodations	railroad passenger cars
largely because of	high-speed transportation
to offer serious competition	relatively short distances
to enter the race	completely out of the water
to take the lead in	to provide fast trips for short distances
the dimensions of fashion and luxury	a powerful horizontal fan
with free yaw on a course	a strong, continuous thrust of air
reliability of engines	airplane-style propellers
experience of helm's watch	the commercial success
at about half the cost	rapid rises in fuel prices
to lie at anchor	small homebuilt and kit-built vehicles
the pride of the nation's passenger fleet	for both civil and military purposes

Ex. 6. Read and translate the text:

TEXT 2A

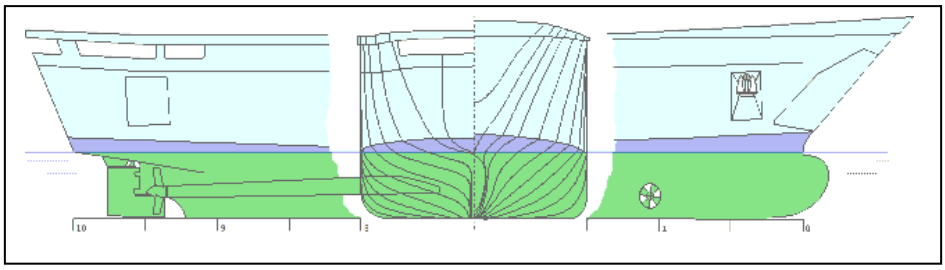
LINERS

The sailing packets that began to cross the Atlantic Ocean in the early 1800's were the first ships to stress passenger comfort. From then on, shipping companies provided better and better passenger services. As ships switched from sails to steam power during the 1800's, British companies offered the best accommodations, largely because of Brunei's excellently designed ships.

Pic. 2: The Normandie in dry dock

Two British firms—the Cunard Line and the White Star Line—dominated transatlantic service until about 1900. Then, Germany's North German Lloyd Line and Hamburg American Line began to offer serious competition. Later, French and Dutch lines entered the race for transatlantic passenger business. Much of this business came from transporting immigrants from the Old World to the New World. The United States took the lead in providing service across the Pacific Ocean with the founding of the Pacific Mail Steamship Company in 1848. As various shipping lines competed for passengers, ships became larger, faster, and more luxurious.

The great age of the ocean liner came in the early 1900s. It reached its height in the 1930's with the launching of three of the most luxurious ships ever built. They were the *Normandie* of France and the *Queen Mary* and *Queen Elizabeth* of Britain. These giants, each almost 1,000 feet (300 meters) long, crossed the Atlantic Ocean in just over four days. In 1942, a fire destroyed the *Normandie* as it lay in New York Harbor.



Pic. 3: The hull architecture of the ocean liner

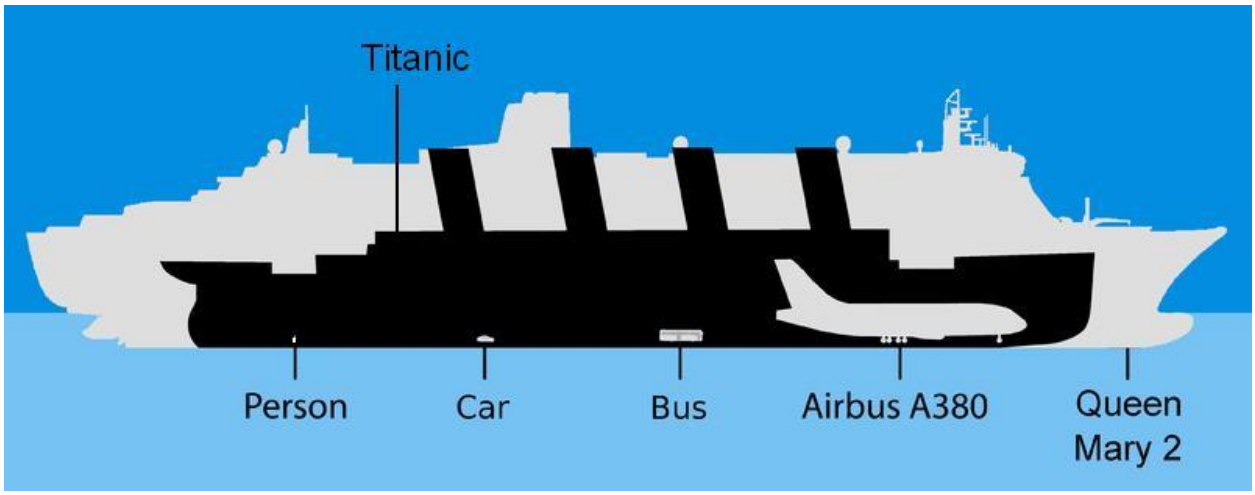
Pic. 4: Modern passenger liner

In designing the hull of the ocean liners the dimensions of fashion and luxury sometimes dominated over sea worthiness. Huge surface volume in bow part of the liner hull caused navigation with free yaw on a course, which did not admit by bulb. The wide aft deck

essentially limited opportunities of a storm rate choice. As a whole the storm safety depended mainly on reliability of engines and experience of helm's watch.

Pic. 5: The Queen Mary 2

Beginning in the late 1940's, the airplane began to attract more and more transoceanic passengers. Today, jet planes fly daily between the world's great cities. They cross the sea in hours, not days, and at about half the cost of an ocean trip. Most ocean liners cannot compete with the airplane and have given up. During the 1960's, Britain sold the *Queen Mary and Queen Elizabeth* to American investors who planned to make tourist attractions of the ships. In 1972, fire destroyed the *Queen Elizabeth* as it lay at anchor in Hong Kong Harbor. In 1951, American shipbuilders launched the *United States,* the pride of the nation's passenger fleet. The *United States* had a cruising speed of 33 knots and was the fastest ocean liner afloat. But in 1969, the ship stopped operating because of a lack of passengers. Today, the United States has no major passenger liner service across the Atlantic.



Pic. 6: The Queen Mary 2 in Comparison

Today, the only luxury liner to make transatlantic crossings is Britain's *Queen Elizabeth 2,* which was launched in 1967. It crosses the Atlantic from April until

December and it carries passengers on a cruise around the world during the winter months. Most liners today are used as cruise ships to the Mediterranean, the Caribbean, and other vacation areas. Norway's *Sovereign of the Seas,* a cruise ship that began service in the Caribbean in 1988 can carry more passengers than any other ship. The *Sovereign* can carry almost 2,700 passengers and 750 crewmembers.

Ex.7. Answer the questions:

1. What were the first ships to stress passenger comfort? 2. What country offered the best accommodations for the passengers in the XIXth century and why? 3. What did transatlantic passenger business come from? 4. What was the reason that ships became larger, faster, and more luxurious? 5. What period is considered to be the great age of the ocean liner? 6. Why were the passenger liners of that time sometimes unsafe? 7. How can you explain a considerable decline of ocean liner service in the second half of the XXth century? 8. What for most liners are used today?

Ex. 8. Agree or disagree with the following statements. Give grounds to your answer:

1. Ships switched from sails to steam power in the XIXth century. 2. British shipping companies had no serious competitors till WWII. 3. The great age of the ocean liner reached its height in the first half of the XXth century. 4. In designing the liner hull the dimensions of sea worthiness and safety were taken into account first of all. 5. Today we can travel across the Atlantic on board several luxury liners. 6. The development of transatlantic liner service was ceased due to the appearance of long-distance airplanes. 7. Many liners stopped their service because of the high fares and lack of comfort. 8. Today, the USA is the only country, which has regular passenger liner service across the Atlantic. 9. Today, Norway's *Sovereign of the Seas* is the largest cruise ship in the world.

Ex. 9. Translate into English:

1. Британские пароходные компании предлагали лучшие условия для пассажиров благодаря превосходно спроектированным кораблям. 2. В конце XIX века Великобритания и Соединенные Штаты заняли лидирующее положение среди стран, предлагающих путешествия через океан. 3. Самыми фешенебельными из когда-либо построенных океанских лайнеров были французская «Нормандия» и британские «Королева Мэри» и «Елизавета». 4. Особенности конструкции корпуса океанских лайнеров являлись причиной «рыскания» на курсе и существенно ограничивали возможности при шторме. 5. Надежность двигателей и опыт вахтенных были основными факторами, от которых зависела безопасность корабля. 6. «Королева Елизавета» была уничтожена пожаром на якорной стоянке в Гонконгской гавани. 7. Так как американские пароходные линии прекратили существование из-за нехватки пассажиров, единственным трансатлантическим лайнером класса «люкс» остается британская «Королева Елизавета 2». 8. Сегодня большинство лайнеров используются в качестве круизных судов в зонах отдыха.

Ex. 10. Define the main topic and idea of the text, split it into the logical parts, make up the plan of the text.

Ex. 11. Abstract the text.

Ex. 12. Skim the text and name the reasons for such popularity of the company mentioned:

TEXT 2B

THE CUNARD LINE SHIPPING COMPANY

The name of the British ship-owner Cunard was well-known to everybody in the XIXth century. Being a smart operator, he opened a scheduled mail service between Liverpool and Halifax, having three wooden paddleboats of 400 horsepower capacity and of 1162 tons displacement.

In 8 years the number of the company's vessels increased by four ships, having a capacity of 650 horsepower and 1820 tons displacement. And 2 years later two more vessels, excelling their forerunners in power and tonnage, were added. In 1853 Cunard Line Company resumed its right of priority for urgent mail shipping and gradually associated in its fleet such new vessels as "*Arabia", "Persia", "China", "Scotland", "Java"* and *"Russia".* All those ships were notable for their high speed and were inferior only to the *"Great Eastern"* in their size. In 1867 the company owned 12 vessels, 8 of them being set in motion by paddles and 4 by propellers.

The significance of the company was great; it became world-famous due to its preciseness in operation. No other transoceanic line had been so well-handled; no other business had been such a success! In the course of 26 years the Cunard Line vessels had crossed the Atlantic Ocean for 2000 times and no trip was abolished; no schedule was broken; no letter, person or ship were lost during their voyages!

As it can be traced from the official reviews of that time, most passengers preferred Cunard Line to all other shipping companies, in spite of powerful competition from the side of France and the USA. Only in the early 1900's, with the transoceanic liners' era approaching, the Company yielded to the times and gradually lost its significance, having become the subject of history.

Ex. 13. Abstract the text in short (8-10 sentences).

Ex. 14. Read and translate the text:

TEXT 2C

SHORT-DISTANCE VESSELS

Although the airplane has largely replaced the ocean liner for transoceanic travel, vessels for carrying passengers on short distances over water have become increasingly important. Such short-distance vessels include car ferries, hydrofoils, and air cushion vehicles.

Car ferries have carried automobiles, passengers, and even railroad passenger cars across harbors, lakes, rivers, and other small bodies of water for many years. Like cargo ships, ferries have become bigger and bigger. Today, the biggest ones cross such large bodies of water as the Adriatic and Baltic seas and the English Channel. The largest car ferries can hold up to 800 passengers and 360 cars. They have dining rooms, lounges, and bars. Some ferries make overnight runs and have cabins for most passengers.

Pic. 7. A River Hydrofoil

Hydrofoils provide high-speed transportation over relatively short distances. These vessels are mounted on foils (wings that skim near the surface of the water). The hull remains completely out of the water, greatly reducing the drag caused by water resistance. Hydrofoils can reach speeds greater than 80 knots. These vessels have carried passengers across New York Harbor, on the Nile River of Egypt, across the Strait of Messina in Italy, and over other bodies of water in many parts of the world.

Pic. 8. An Air Cushion Vehicle

Air cushion vehicles also provide fast trips for short distances. Such vehicles are also called hovercraft or ground effect machines. Air cushion vehicles have a powerful horizontal fan that produces a strong, continuous thrust of air between the vehicle and the water or ground beneath it. The craft, which is driven by airplane-style propellers, rides on this cushion of air and can do almost 70 knots. Some are able to exceed speeds of 95. These are normally called flarecraft. Air cushion vehicles are especially popular in Great Britain, where they have carried passengers on the River Thames, along the coasts, and cars and passengers across the English Channel from Dover to Calais in France. This service ceased in 2002 when the Chunnel took over the fast transit of cross-channel traffic.

Though the commercial success of hovercrafts has suffered from rapid rises in fuel prices following conflict in the Middle East, there is an increasing number of small homebuilt and kit-built vehicles used for fun and racing purposes, mainly on inland lakes and rivers and also in marshy areas and in some estuaries. In spite of alternative over-water vehicles such as wave piercing catamarans, which use less fuel and can perform most of the hovercraft's marine tasks, they are still being developed in the world for both civil and military purposes.

Ex. 15. Answer the questions:

1. What do short-distance vessels include? 2. What for car ferries are used? 3. How much weight can the largest car ferries hold up? 4. What is the hydrofoil? 5. How can you define the term "a foil"? 6. What is the working principle of the air cushion vehicle? 7. What is the difference between the hovercraft and the flarecraft? 8. Where are the hovercrafts widely used now? 9. Which vessel is more rapid, a hydrofoil or an air cushion one? 10. What can you say concerning the alternative over-water vehicles?

Ex. 16. Explain why:

a) vessels for carrying passengers on short distances over water have become increasingly important;
b) in the case of the hydrofoil the drag caused by water resistance is greatly reduced;
c) the hovercraft service across the English Channel ceased in 2002;
d) the commercial success of hovercrafts has suffered

Ex. 17. Develop the idea:

1. Car ferries have become bigger and more comfortable.
2. Hydrofoils are one of the best means of high-speed transportation over relatively short distances.
3. Air cushion vehicles provide fast trips for short distances.
4. Hovercrafts are still being developed in the world for both civil and military purposes.

Ex. 18. Make up a short summary of the text.

Ex. 19. Describe the peculiarities of the ocean liner hull architecture, using picture 2.

*Ex. 20. **Speak on the topic: "Passenger Vessels"***

UNIT III
CARGO SHIPS

Ex. 1. Read and remember the words:

Tramp, derrick, hatch, crate, chinaware, cell, ramp, lighter, barrel, spill, detergent, hold, hose, poop, bin, lumber, package, cell, facilities, pickup, chip

Wander, assign, mount

Loose, disastrous, reciprocating

Roll-on/roll-off (ro-ro) ships, LASH ships, O/O carriers, O/B/O ships

Ex.2. Insert the right word:

Hatches, hold, disastrous, barrels, ramps, derricks, tramp, poop, cells, lighters, wander, assigned, bin, spill, loose.

1. ... ships … the sea-lanes like taxicabs and can be hired. 2. Today, cargo ships have powerful, electrically driven cranes and … . 3. The pollution resulted from an oil … could be … to the region. 4. The traditional general cargo ship can be loaded at the side and stern as well as at the … . 5. The hull of a container ship is divided into … by vertical guide rails. 6. Dockworkers, by way of inboard … or elevators, take the containers to their … places. 7. The first modern bulk carriers had a … to house the engines at the stern and a long … to hold iron ore. 8. Earlier tankers carried oil in … and then in large tanks. 9. Dry bulk carriers transport fertilizer, grain, ore, salt, sugar, wood chips, or any other cargo that can be piled … into a … . 10. LASH ships are huge freighters that carry preloaded seagoing … .

Ex. 3. Change the words of italic type with their synonyms from your active vocabulary:

1. Loading and unloading on the container ships are made with the help of *special cranes.* 2. *Ship stores* are divided into several *rooms.* 3. This old sailor *roved* a lot

in his life. 4. *Timber* is carried by ships from Canada all over the world. 5. The freight consists of several hundreds of *boxes.* 6. You can get into the *bunker* only through this *bulkhead.* 7. The *stern* of the ship settled down into the water. 8. Some cargoes are moved into the hold on a special *trap.* 9. Firemen often use *water cannons* to fight fire. 10. He was *appointed* the captain of the ship. 11. The cargo is in unfixed state.

Ex. 4. Define in one word:

a) the unit of oil volume;
b) a kind of a ladder or trap;
c) the back part of a ship;
d) a room where cargo is stored during the sea journey;
e) a special port instrument for loading and unloading the ships;
f) a substance for cleaning something
g) a disaster when oil gets into the water.

Ex. 5. Translate into Russian:

to include such products as	to carry only one type of cargo
liquid cargo	need special port facilities
to run on fixed schedules	to be useful only for long hauls
to meet safety standards	various economic advantages
high operating costs	the ship's huge capacity
to require much time and labour	to haul several kinds of cargo at the same time

Ex. 6. Read and translate the text:

TEXT 3A

GENERAL CARGO SHIPS

Cargo ships, or freighters, can be divided into four groups, according to the kind of cargo they carry. These groups are general cargo ships, tankers, dry bulk carriers, and multipurpose ships. *General cargo ships* carry what are called "packaged" items—goods that are put in packages or that form a package in them. Packaged items include such products as chemicals, foods, furniture, machinery, motor vehicles, shoes, steel, textiles, and whiskey. *Tankers* carry petroleum or other liquid cargo. *Dry bulk carriers* haul coal, grain, iron ore, and similar products that can be loaded *in bulk* (loose) on the vessels. *Multipurpose ships* carry different classes of cargo—for example, liquid and general cargo—at the same time.

Cargo ships can also be divided into two types according to the service they offer shippers— *liner service* or *tramp service.* Cargo liners run on fixed schedules along certain trade routes and charge published rates. They usually transport only general cargo. Some cargo liners also carry passengers. Those that carry more than 12 passengers are called *combination* or *passenger-cargo* ships. These vessels must meet safety standards set up for passenger ships. Large shipping companies operate cargo liners. Tramp ships do not sail on regular trade routes or have regular schedules. They wander the sea-lanes like taxicabs and can be hired to haul almost anything, anywhere, anytime. Small shipping companies and private individuals operate these ships.

Pic. 9. Container ship

Since World War II, the traditional general cargo ship has steadily become more advanced. Today, it has powerful, electrically driven cranes and derricks. It can

be loaded at the side and stern as well as at the hatches. It has automatic engine room controls and automatic navigation equipment. Yet the traditional general cargo ship has steadily been declining in use today, chiefly because of high operating costs. A typical ship may carry automobiles, sacks of flour, cases of whiskey, television sets, airplane engines, crates of chinaware, and a variety of other items. Loading and unloading such a mixture of items of varying shapes and sizes requires much time and labour and is, therefore, expensive. As a result, the number of ships designed to carry only one type of cargo—tankers and dry bulk carriers, for example—has increased. Revolutionary versions of the general cargo freighter have also been developed. They include container ships, roll-on/roll-off ships, and LASH ships.

Pic. 10. A ro-ro passenger car ferry

The largest container ships measure about 700 feet (210 meters) long. They can carry over a thousand 20-foot (6-meter) containers that hold a total of about 12,000 tons of cargo. Container ships eliminate the individual hatches, holds, and derricks of the traditional general cargo vessel. The hull of a container ship is simply an enormous warehouse divided into *cells* by vertical guide rails. The cells are designed to hold cargo in prepackaged units called *containers.* Most containers consist of a standard sized aluminum box that measures either 20 or 40 feet long. A 40-foot container is about the size of a railroad car.

Roll-on/roll-off ships take containers mounted on a framework of wheels like a truck trailer. These ships have a stern opening and side openings.

Dockworkers drive the containers up ramps onto the ships and then, by way of inboard ramps or elevators, take them to their assigned places. Roll-on/roll-off ships also haul cars, buses, house trailers, trucks, and any other cargo that can be rolled aboard. An international partnership, the Atlantic Container Line, put the world's largest roll- on/roll-off ships into operation in 1987. The five ships are each 958 feet (292 meters) long and can do 18 knots. Each one can carry about 1,100 40-foot (12-meter) containers and about 1,000 cars and trucks.

LASH ships are huge freighters that carry preloaded seagoing *lighters* (barges) stacked one upon the other. The term *LASH* stands for Lighter Aboard Ship. The lighters are loaded at upriver ports with any kind of cargo and then towed by tugs to the seaport. There, cranes on the carrier ship lift the barges on board. The freighter then carries the barges to a seaport across the ocean. There, the barges are lowered into the harbor and then towed upstream to their final ports.

LASH ships measure up to 875 feet (267 meters) long and 107 feet (33 meters) wide and can travel at 20 knots. They can hold from 70 to 90 barges, each of which can carry 370 tons of cargo. The first LASH ship, *the Acadia Forest,* began operation in 1969 between New Orleans, La., and Rotterdam, the Netherlands. A United States line operates the Norwegian-owned ship.

All these modern ships need special port facilities. Throughout the world, ports are being built or modernized to handle these vessels. The new facilities have giant cranes and other lifting equipment because container ships have few or no derricks. In port, the ships chiefly need large open areas where their thousands of containers can be left while waiting loading or pickup. The most advanced ports use computers to assign the loading and pickup areas.

Ex.7. Answer the questions:

1. What groups can cargo ships be divided into? What is the principle of this division? 2. What do we called “packaged items”? 3. What two types can cargo ships also be divided into according to the service they offer? 4. Can cargo ships

offer passenger service as well? 5. Why has the traditional general cargo ship steadily been declining in use today? 6. What are the so-called "revolutionary" versions of the general cargo freighter? 7. How does the container ship differ from other types of cargo ships? 8. What kind of cargo can roll-on/roll-off ships carry? 9. In what way can lighters cross the oceans? 10. What for do ships chiefly need large open areas in modern ports?

Ex. 8. Agree or disagree with the following statements. Give grounds to your answer:

1. Cargo ships are divided into several groups, according to the kind of cargo they carry. 2. Cargo liners and tramps run on fixed schedules. 3. Cargo ships can also carry passengers. 4. The number of general cargo ships is steadily increasing nowadays. 5. Container ships carry cargo in large containers put on deck. 6. A lighter is a kind of a barge. 7. Though lighters sail mainly in fresh waters, they are projected to make sea and voyages as well if necessary. 8. The appearance of modern ports with special facilities resulted from the appearance of new kinds of freighters.

Ex. 9. Translate into English:

1. Грузовые суда делятся на четыре группы в зависимости от груза, который они перевозят. 2. Суда, перевозящие нефть или другие жидкие грузы, называются танкерами. 3. Это судно ходит согласно установленному расписанию по определенному маршруту и взимает фиксированную оплату за перевозки. 4. Суда этой частной компании похожи на такси – их можно нанять в любое время для перевозки чего угодно куда угодно. 5. Число

грузовых судов, предназначенных для перевозки любых грузов, в настоящее время значительно снизилось, в основном, из-за высокой стоимости перевозок. 6. Корабль для контейнерных перевозок – это просто большой пакгауз, разделенный на отсеки для перевозки грузов в предварительно загруженных контейнерах. 7. Корабли для перевозки лихтеров перевозят через океан баржи, которые просто устанавливаются на палубе друг на друга. 8. Для погрузочно-разгрузочных работ современному порту нужны огромные краны и другое специальное оборудование.

Ex. 10. Define the main topic and idea of the text, split it into the logical parts, and make up the plan of the text.

Ex. 11. Abstract the text.

Ex. 12. Skim the second part of the text and give detailed answers to the questions below:

TEXT 3B
SHORT HISTORICAL OUTLINE

During the early 1900's, the standard general cargo ship was a *three-islands.* Its name came from three structures that stood out above the main deck like separate islands. The forecastle, which held the crew's quarters, formed one island at the bow. The bridge, from which the ship was navigated, formed the second island in the middle of the ship. The engine room was below the bridge. The poop, which held cabins for the officers and passengers, formed the third island at the stern. Hatches between the islands led to the holds beneath the deck where the cargo was stored. Each hold was a separate area with a hatch cover over it. The *derricks* (lifting devices) that loaded and unloaded each hold rose alongside the hatches.

In time, the three-island ships gave way to freighters with one island, either in the middle of the ship or toward the stern. The island included the bridge and living quarters, with the engine room below. The one-island ship provided room for more and bigger hatches and so made it easier to load and unload cargo. During World War II (1939-1945), shipyards in the United States built more than 3,000 one-island ships—the famous Liberty and Victory ships. Both types of ships were about the same size, but the Victory ships, powered by steam turbines, were faster. The Liberty ships had reciprocating steam engines. Both ships were built according to standard plans so they could be mass-produced. They carried millions of troops and millions of tons of supplies to battlefields in every part of the world.

Tankers were among the first ships designed to carry only one kind of cargo—petroleum. Earlier ships carried oil in barrels and then in large tanks. In 1878, Ludwig Nobel of Sweden launched a ship that was simply one great tank itself. Nobel was the brother of Alfred Nobel, founder of the famous Nobel Prizes. His tanker hauled oil from the Baku fields in southeastern Russia across the Caspian Sea.

In 1885, the first oceangoing tanker, the *Gliickauf,* was launched. This ship, built in Great Britain for a German oil company, carried petroleum from the United States to Europe. It became the model for all later tankers. Its hold space had eight big tanks, and its engine room was set in the stern to reduce the danger of fire. The vessel was 300 feet (91 meters) long and 37 feet (11 meters) wide. It carried 2,300 tons of oil and could travel 9 knots.

During the late 1950's, shipbuilders began to design vessels that could haul either ore or oil. These ships are called *O/O* carriers. During the 1960's, another new type of carrier appeared—the *O/B/O.* An O/B/O ship can haul ore; light bulk cargo, such as grain or fertilizer; or oil. The largest O/O ship can haul about 250,000 tons of cargo. The largest O/B/O vessels can carry up to 150,000 tons.

a) What is the three-islands? What can say about the origin of the term?

b) What was the next stage of cargo ships' development?

c) Were there any differences between Liberty and Victory ships?

d) How can modern tankers be connected with the Nobel Prize?

e) Do O/O carriers differ from the O/B/O ones only in size?

Ex. 13. Read and translate the 3d part of the text:

TEXT 3C

ONE-TYPE AND MULTIPURPOSE CARGO VESSELS

Pic. 11. Commercial crude oil supertanker

Tankers were among the first ships designed to carry only one kind of cargo — petroleum. Earlier ships carried oil in barrels and then in large tanks. The first tanker was 300 ft long and could carry about 2000 t of oil traveling 9 knots.

Today, large tankers, often called *supertankers,* can carry more than 500,000 tons of oil and can do about 15 knots. Even larger supertankers are being planned and built. But these giants are useful only for long hauls. Most of them are used to transport oil from the Middle East to Europe and Japan.

Supertankers have various economic advantages over smaller tankers. For example, it costs much less to ship a large amount of oil in one supertanker than in many small tankers. But supertankers also have major disadvantages. Their huge size makes them difficult to navigate and increases the risk of accidents. Because of their size, supertankers require ports as deep as 100 feet (30 meters) in order to unload. If a supertanker suffers an oil spill, the pollution that results could be disastrous because of the ship's huge capacity.

Dry bulk carriers transport fertilizer, grain, ore, powdered detergents, salt, sugar, wood chips, or any other cargo that can be piled loose into a hold. Like tankers, these vessels were designed to carry only one kind of cargo. But unlike tankers, the ore carriers hauled solid cargo. As a result, they required more complicated loading and unloading arrangements than tankers, which needed little more than hose connections and pumps.

The first modern bulk carriers included the specially designed boats that began hauling iron ore on the Great Lakes during the late 1800's. The Great Lakes ore carrier resembled a long steel box. It had a forecastle to accommodate the crew and bridge at the bow, and a poop to house the engines at the stern. Between the forecastle and the poop, there was a long bin to hold iron ore. Modern Great Lakes freighters have the same basic design, but they are larger than the earlier carriers. The largest vessels today are more than 700 feet (210 meters) long and carry up to 25,000 tons.

Oceangoing bulk carriers have also grown larger and larger. The biggest ones can carry more than 100,000 tons of cargo. A modern seagoing bulk carrier has the bridge and engine room near the stern. The rest of the ship is a level area of deck with a line of hatches. Motor-driven equipment on board quickly removes the enormous hatch covers.

Barges are somewhat like small bulk carriers. These boxlike vessels haul such cargoes as cement, coal, grain, gravel, and sand across harbors, on canals and rivers, and along coasts. Before the invention of power-driven machinery, sails propelled most canal and river barges. In areas where the wind was unreliable, men or animals trudged along the bank of a canal or river and pulled the barges. In Egypt, India, and some other countries, barges are still towed in this way. Modern barges have diesel motors or are towed by tugs. The size of a canal or river barge is limited by the waterway on which it operates. The barge must be short enough to make the curves in the waterway and narrow enough to pass through canals. Barges that operate in coastal waters can be practically any size.

Multipurpose ships are designed to haul several kinds of cargo at the same time. An example is the British ship *Strathardle,* launched in 1967. It has refrigerated space for foods that spoil easily, tank space for liquid cargo, and a deck for automobiles. Another multipurpose ship is the *Bore VI,* a small Finnish freighter also built in 1967. It hauls roll-on/roll-off vehicles, large rolls of paper, packaged lumber, and general cargo. In 1968, the *Mormacsea,* the first American-built multipurpose vessel, was launched. It can carry containers, roll-on/roll-off cargo, and general cargo. It also has refrigerated space.

Ex. 14. Answer the questions:

1. What ships were designed first to carry only one kind of cargo? 2. What advantages and disadvantages do supertankers have? 3. How can you characterize in short the cargo which is transported by dry bulk carriers? 4. Where and what for were the first dry bulk carriers designed? 5. How did earlier tankers carry oil? 6. What for are modern supertankers being planned and built? 7. What design have dry bulk carriers had for centuries? 8. What are multipurpose cargo ships for? 9. What cargo ship is preferable for a small shipping company to your mind? 10. What type of cargo ships do barges resemble? 11. How were barges propelled in the past? 12. What determines the size and shape of a river or canal barge?

Ex. 15. Explain why:

a) tankers might get its name;
b) supertankers are useful only for long hauls;
c) supertankers have many economic advantages over smaller tankers;
d) dry bulk carriers required more complicated loading and unloading arrangements than tankers;
e) multipurpose cargo ships are being launched in various countries;
f) barges that operate in coastal waters can be practically any size.

Ex. 16. Develop the idea:

1) Supertankers are widely used nowadays in spite of their disadvantages;
2) Modern dry bulk carriers do not much differ from the first ones;
3) Multipurpose cargo ships are becoming more and more popular;
4) Barges are like small dry bulk carriers.

Ex. 17. Make up a short summary of the text.

Ex. 18. ***Speak on the topic "Cargo Ships".***

UNIT IV

SPECIALIZED VESSELS

Ex. 1. Read and remember the words:

Coble, slipway, fitting, gantry, transom, dissection, non-sweeping, consequence, rolling, pitching, contradiction, searchlight, livelihood, hardship, salvage, capability, foam, receipt, captivity, dead-wood, stock, valves, elimination, echo-sounder, precaution, distress, payload, hawser, notch, momentum, reefer, commodity, survey, strata, conveyance;

Freeze, confuse, process, endure, drift, heel, quarrel, numb, gut, strand, rescue, render, weld, designate, differentiate;

Inseparable, arduous, rigorous, bitter, tough, indispensable, immense, dual;

Ashore

Ex.2. Insert the right word:

Contradiction, foam, distress, hardships, precautions, fitting, reefer, drifted, welding, consequences

1. The expedition suffered a lot of … ; the major one was the lack of food. 2. The fire can be fought either with water or with… . 3. The … is another name for the refrigerator ship. 4. Elements in metal structures are usually fitted by … . 5. Your actions come into … with existing laws. 7. The … of the device took several hours. 8. This … may have serious … for biological life in the area. 9. There was no wind and the boat … slowly. 10. This work may be dangerous; you must take … beforehand.

Ex. 3. Change the words of italic type with their synonyms from your active vocabulary:

1. Salvage ships are aimed to *save* vessels and people in the case of *disaster*. 2. For towing ships *steel cables* are used. 3. To erect a structure the builder must have a *review* of ground *layers*. 4. This material is very *dense*. 5. The engineer *indicated*

all the disadvantages of the project. 6. The *liquidation* of the reasons that cause the accident might have prevented it. 7. The *conveniences* of the inner design make this yacht type very attractive for wealthy customers. 8. Wooden hulls of sailing ships had to be regularly *careened* to preserve the speed of the vessel. 9. Liners are the most comfortable means of marine *transportation*. 10. Icebreakers can move through the ice due to their great *inertia*.

Ex. 4. Define in one word:

a) a small fishing vessel with a flat bottom;
b) a kind of a shelf or a type of antenna;
c) an obstacle *(in a figurative sense)*;
d) a cargo transportation of which is paid by a customer;
e) an acoustic device to define the distance under the water;
f) a powerful lamp sending light for many miles away;
g) huge or giant;
h) salary or income necessary for life;
i) smth necessary or important;
j) potential abilities or talent.

Ex. 5. Translate into Russian:

to do particular jobs
to become an inseparable part
to range in size
the supposed area of fishing
through the special stern slipway
to have an area of
all kinds of rolling and pitching
ready for supplying to the customer
to endure bitter cold
the hardships of the task
to offer the assistance
floating objects
operations on rescue of people
struggle for survivability
regenerative works
an underwater part

connected to accident precaution
a strengthened hull
the immense weight of the ship
to transport perishable commodities
temperature-controlled transportation
conventional vessels
hydrographic and seismic surveys
navigational charts for shipping
the strata beneath the seabed
to fulfill a dual role
to operate in polar waters
overnight journeys
double-berth cabins
plenty of storage space
heavy bulb keel
a great sail area
vessels with basic accommodation
sophisticated and luxurious boats

Ex. 6. Read and translate the text:

TEXT 4A
FISHING SHIPS

Many ships and boats have been designed to do particular jobs. Refrigerator ships, tugboats, salvage ships, train ferries, icebreakers, oceanographic ships and of course fishing vessels of different types has become an inseparable part of the world fleets.

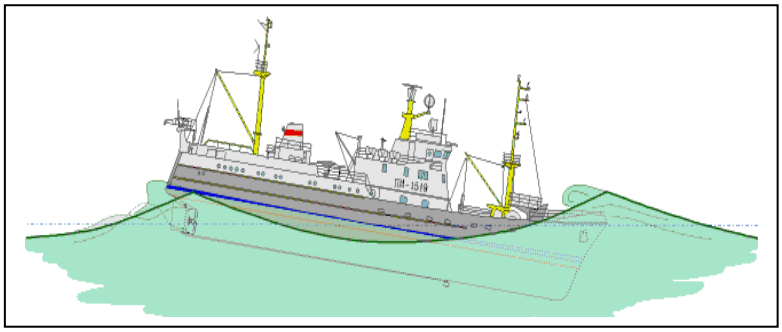
Fishing vessels range in size from small inshore fishing craft (motor-powered cobles) to large, freezer-factory ships, they differ in the supposed area of fishing (deep-sea, inshore and middle-water fishing) and the model of operating (trawlers, seiners, drift net vessels, whale factories, etc.).

In fish harbours and on seaways one can meet many small fishing vessels – trawlers. There are two types of trawlers: side and stern. The sizes of them are usually very different. The length of side trawlers is not more than 50-60 m and they have special equipment for side trawling. The stern trawlers rise and drop their trawl through the special stern slipway. A recently-built stern trawler is 73 m overall. Side trawlers have superstructure aft and stern ones have it in the middle of the hull or forward. The working deck of a large stern trawler can have an area of about 400-420 sq m which must be clear of all deck fittings, so that a full trawl

may be spread out. The design of the modem fishing vessel incorporates a high, soft-nosed stem, well-flared bows, streamlined bridge and superstructure, a gantry and transom stern.

Such transom stern was first adopted by whale factory ships to haul their catch up to the deck for dissection.

The work here can be rather dangerous, because the main feature of fishing vessels is the necessity of crew work on the top deck, in storm weather including.



Pic. 12. A fishing trawler navigation mode

That is why, the achievement non-sweeping of a bow deck, which has by a consequence increasing all kinds of rolling and pitching, comes in the obvious contradiction with a safety of work on the aft trawl deck.

The stern fishing vessel described here must not be confused with the larger, stern fishing factory vessels which are used not only to catch fish, but also to process them. These ships have equipment to behead, clean, and refrigerate the fish, concentrating on filleting and freezing all fish in their various species, and packing them in cartons ready for supplying to the customer.

The smaller boats usually return daily to catch the early market. The large craft are usually away from port three or four days, fishing the more distant grounds. The deep-sea fishermen experience many disadvantages. They are away from home for three weeks at a time and usually put to sea again after only 48 hours ashore, so that they cannot have much home life. Their hours and conditions of work are most arduous. Winter in the northern water is very rigorous. The fishermen endure bitter cold and face danger from stormy seas and drifting ice flows. With numbed hands, they gut the icy fish upon the heeling deck. Light floods down upon them from an overhead searchlight while all around are the freezing waters and seeming endlessness of the Arctic night. But this is their life

and their livelihood. They go to bring the harvests of the Northern seas to help to feed their countrymen.

Deep-sea trawling has been called the toughest job in the world and nobody who has studied the hardships of the task will quarrel with the description.

Ex.7. Answer the questions:

1. How can you define a specialized vessel? 2. What kinds of fishing vessels can you name? 3. What two principles are they classified by? 4. What trawler is bigger: a side or a stern one? 5. What is the difference between them except their size? 6. What is included into the typical design of the modem fishing vessel? 7. Why can the work of a fisherman be rather dangerous? 8. Why is the achievement non-sweeping of a bow deck in the contradiction with a safety of work on the aft trawl deck? 9. What is the difference between the stern fishing vessel and the stern fishing factory vessel? 10. What disadvantages experienced by the deep-sea fishermen can you enlist?

Ex. 8. Agree or disagree with the following statements. Give grounds to your answer:

1. Fishing vessels include a wide range of ships: from the small to huge ones. 2. The trawler is one of biggest fishing vessels. 3. There are three types of trawlers: a side, a stern and a bow one. 4. The crew work on the top deck may be dangerous in storm weather. 5. The trawler design stern appeared due to whale factory ships. 6. Due to its design a trawler is free from any kind of rolling and pitching. 7. The stern fishing factory is a kind of the trawling stern fishing vessel. 8. All fish on board of the stern fishing factory is stored altogether and packed for customers only ashore. 9. The deep-sea fishermen work mainly in the southern seas. 10. Deep-sea trawling is one of the hardest toughest jobs in the world.

Ex. 9. Translate into English:

1. Специальные суда предназначены для выполнения определенного вида работы. 2. Моторные плоскодонные лодки относятся к внутреннему рыболовецкому флоту. 3. Тип рыболовецкого судна зависит от предполагаемого района ловли. 4. Кормовой стапель – это часть специального оборудования траулера. 5. Рабочая палуба кормового траулера должна быть свободна от надстроек, чтобы можно было полностью развернуть трал. 6. Транцевая корма была впервые применена на китобойных плавучих фабриках, чтобы поднимать улов на палубу. 7. Незаливаемость носовой палубы траулера противоречит безопасности работ на корме. 8. Плавучие рыболовецкие фабрики используются не только для ловли, но и обработки рыбы. 9. Суда, которые ловят рыбу на более удаленных площадках, обычно отсутствуют в порту несколько дней. 10. Тот, кто знает трудности этой работы, не будет оспаривать, что она одна из самых тяжелых в мире.

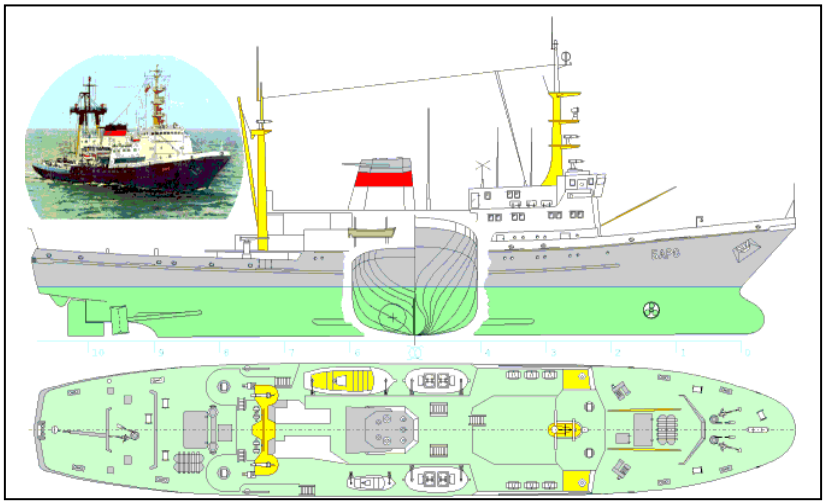
Ex. 10. Define the main topic and idea of the text, split it into the logical parts, and make up the plan of the text.

Ex. 11. Abstract the text.

Ex. 12. Read and translate the text:

TEXT 4B
SALVAGE AND SERVICE SHIPS

Salvage ships are an invaluable part of any naval fleet, and their capabilities cover many areas. When a ship becomes disabled on the high seas, a salvage vessel can assist by towing or by using its heavy-lift equipment. In addition, it will remove stranded ships from shorelines, and offer the assistance of divers for rescue operations. These ships can also provide firefighting help, using either foam or seawater.



Pic. 13. A Salvage Ship

The main two functions of salvage ships are: (1) towage of floating objects and (2) salvage operations on rendering assistance to a vessel suffering disaster and rescue of a human life on the sea.

For today salvage (or rescue) ships render the following services:

- Search of a vessel or people suffering disaster on the sea;
- Carrying out of operations on rescue of people and rendering of the necessary help;
- Struggle for survivability of a vessel together with crew or without participation of crew of a saved vessel (struggle against a fire, receipt outboard waters, an icing; dewatering compartments; moving of cargoes, a ballast and so forth);
- Maintenance of a vessel on afloat;
- Removal of a vessel from a bank, reeves, etc.;
- Regenerative works on restoration of a saved vessel's seaworthiness and repair of ship systems and devices;
- Clearing of a vessel from ice captivity, near to dangers, at a direction of drift aside dangers, and also in case of damage of the case or rudder-propeller devices of a vessel;
- Towage of a saved vessel in a safe place (a port, a bay, a shallow, etc.);
- Survey and clearing of an underwater part of a vessel;
- Underwater welding works;
- Elimination defect breakdown cases of a vessel, various mechanisms and devices (a dead-wood, a stock, a rudder, a valves and so forth), having contact with outboard water;
- Repair sliding outboard devices of echo-sounders and hydroacoustic stations;

The salvage service is indispensable on sea ways, in areas of basing and a craft of courts of fleet of a fishing industry and fishing collective farms, in areas of the diving and other works connected to accident precaution or liquidation of their consequences and a safety.

Service ships are designed for a particular kind of job. They include tugboats, pilot ships, refrigerator vessels, icebreakers, fire-fighting ships, cable layers, floating lighthouses and a lot of other types.

Tugboats provide assistance to large vessels heading into port. Without their help, the giant ships would find maneuvering in shipping lanes to be very difficult. In addition, tugboats can tow massive vessels in distress, bringing them out of dangerous areas. Tugboats are quite strong for their size. Early tugboats had steam engines; today diesel engines are used. Tugboat engines typically produce 750 to 3000 horsepower (500 to 2000 kW), but larger boats (used in deep waters) can have power ratings up to 25 000 hp (20 000 kW). The engines are often the same as those used in railroad engines, but typically drive the propeller mechanically instead of converting the engine output to power electric motors, as is common for railroad engines. Tugboats are highly maneuverable and various propulsion systems have been developed to increase maneuverability and increase safety.

Pic. 14. River Tugboat

There are two groups of tugboats, either Inland or Oceangoing.

Inland tugboats come in two categories:

1) Harbour tugs (the most typical of the tugboats that people recognize. They are used worldwide to move ships in and out of berth and to move industrial barges around waterfront business complexes);
2) River tugs (also referred to as towboats or pushboats. They are designed as large squared off vessels with flat bows for connecting with the rectangular stern of the barges).

Oceangoing tugboats come in four categories:

1) The conventional tug (the standard seagoing tugboat with a model bow that tows its payload on a hawser);
2) The notch tug (assigned to tow and push a specific barge, usually built to the shape and specifications of that tugboat);

3) The articulated tug and barge, or ATB, (a specially designed vessel, comprised of a tugboat and a barge which are coupled using specially designed machinery;
4) The integrated tug and barge, or ITB, (a rigidly connected tug and barge).

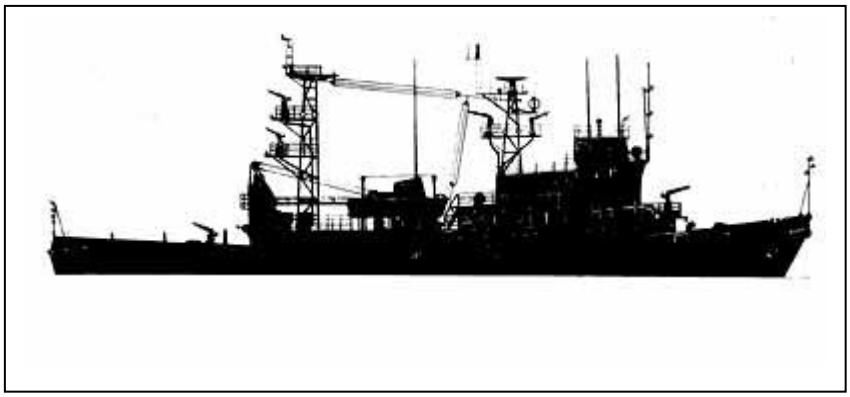
Pic. 15. Pilot ships

An icebreaker is a special purpose ship or boat designed to move and navigate through ice-covered waters. The term *icebreaking,* however, can also refer to smaller vessels (e.g., icebreaking boats that were used on the Canals of Great Britain in the days of commercial carrying). As for a ship to be considered an icebreaker it requires three components: a strengthened hull, an ice-clearing shape, and the power to push through, none of which are possessed by most normal ships. To pass through ice-covered water, an icebreaker uses its great momentum and power to drive its bow up onto the ice, breaking the ice under the immense weight of the ship.

The reefer (or refrigerator ship) is a type of ship typically used to transport perishable commodities which require temperature-controlled transportation, mostly fruits, meat, fish, vegetables, dairy products and other foodstuffs.

Reefers may be split into two categories:

1) Sidedoor vessels, which have sidedoors that are lowered to the quay and serve as loading and discharging ramps;



2) Conventional vessels, which have a traditional cargo operation with hatches and cranes or derricks.

Pic. 16. Russian fire fighting ship "Katun-2"

As for the other ships like cable layers pilot vessels, fire fighting ships, floating lighthouses their functions are quite obvious.

Ex. 13. Answer the questions:

1. What for can salvage ships be used? 2. What are the main two functions of salvage ships? 3. What main service can salvage ships provide? 4. What areas is the salvage service indispensable? 5. What vessels are included into service ships? 6. What is the main task of tugboats? 7. What groups and categories can tugboats be divided into? 8. What are the particular features of the icebreaker design? 9. What is the principle of icebreaking? 10. What categories of reeferships can you name?

Ex. 14. Explain why:

1) salvage ships are an invaluable part of any naval fleet;
2) so different kinds of ships are referred to one group of service vessels;
3) the tugboats engines are more powerful than, for example, the railroad ones;
4) the immense weight is very important for the icebreaker;
5) there is a need for a special refrigerator vessels.

Ex. 15. Develop the idea:

a) The capabilities of salvage ships cover many areas;
b) Without the tugboats, the giant ships would find maneuvering in shipping lanes to be very difficult;
c) The icebreaker has peculiarities, none of which are possessed by most normal ships;
d) Refrigerator ship is a type of ship typically used to transport perishable commodities.

Ex. 16. Abstract the text.

Ex. 17. Skim the text.

TEXT 4C
RESEARCH VESSELS AND PLEASURE BOATS

Pic. 17. The French research vessel "Pourquoi pas?"

Research vessels carry out a number of roles at sea. Some of these can be combined into a single vessel, others require a dedicated vessel.

Fisheries science requires platforms which are capable of towing a number of different types of fishing net, collecting plankton or water samples from a range of depths, and carrying acoustic fish-finding equipment. Fisheries research vessels are often designed and built along the same lines as a large fishing vessel, but with space given over to laboratories and equipment storage, as opposed to storage of the catch.

Hydrographic survey vessels are used to conduct hydrographic and seismic surveys of the seabed and the underlying geology.

This information is useful for both producing navigational charts for shipping, and for detecting geological features which are likely to bear oil or gas. These vessels usually mount equipment on a towed structure, for example, air-cannons, used to generate a high pressure shock wave to sound the strata beneath the seabed, or mounted on the keel, for example, a depth sounder.

Oceanographic research vessels carry out research on the physical, chemical and biological characteristics of water, the atmosphere and climate, and as such, are required to carry equipment for collection of water samples from a range of depths, including the deep seas, as well as equipment for hydrographic sounding of the seabed, along with numerous other environmental sensors.

As the requirements of both oceanographic and hydrographic research are very different to those of fisheries research, these boats often fulfill a dual role. Due to the demanding nature of the work these ships have to deal with, research vessels are often constructed around an icebreaker hull, allowing them to operate in polar waters.

Pic. 18. A sailing yacht

When one speaks about pleasure boats first of all he imagines a yacht, of course. While the word *Yacht* in the dictionary sense is merely a small boat, in modern use designates two rather different classes of watercraft, sailing and power yachts (we also must distinguish between racing and cruising yachts). Yachts are differentiated from working ships mainly by their leisure purpose: they are comfortable conveyances owned by the wealthy.

There are many different yacht types depending on their purpose, construction model and propulsion. Here can be named:

1) Day sailing yachts, having no cabin and being designed for hourly or daily use and not for overnight journeys;
2) Weekender yachts, possessing a single "saloon" with bedspace for two or three people;
3) Cruising yachts, being quite complex in design and capable of taking on long-range passages of many thousands of miles. Such a vessel will usually have many rooms below deck. Typically there will be three double-berth cabins; a single large saloon with galley, seating and navigation equipment; and a "head" consisting of a toilet and shower-room. The interior is often finished in wood panelling, with plenty of storage space;

4) Racing yachts, with the light hull but having a deep and heavy bulb keel, allowing them to support a tall mast with a great sail area.

Yacht lengths generally start at 32–35 feet (10–11 m) and go up to hundreds of feet. A mega yacht generally refers to any yacht (sail or power) above 100' or 34 m and a super yacht generally refers to any yacht over 200' or 70 m. This size is small, of course, in relation to say cruise liners and oil tankers.

In recent years, small- to medium-sized private yachts have evolved from fairly simple vessels with basic accommodation into sophisticated and luxurious boats.

Ex. 18. Make up the classification of research vessels and yachts.

Ex. 19. Speak on the topic "Specialized Vessels".

UNIT V
ART OF SHIPBUILDING

Ex. 1. Read and translate the words. Include them into your vocabulary:

Provision, garbage, hull, engine, rudder, machinery, regulation, keel, rib, shape, compartment, boiler, bow, stern, wire, pipe, framework, shipway, valve, superstructure, pier, trial, bulkhead, roughness, squall, floatation, non-sweep, careen, rolling, pitching, ridge, evasion, crest, helmsman, abyss, contour, dugout, liburne, consequence, bulb, quarterdeck, sternpost, submission, slamming, shipyard, circumstance, welding, buffer store, building berth, assembling, section, block, prefabrication, template, building dock, lofting, fitting out, marking off, adjustment, butt, advisability;

To adjust, to prefabricate, to assemble, to weld, to christen, to slide, to dispose, perceive, immerse, trim, to overlap, envisage;

Complicated, enormous, watertight, temperate, concave, clinker-built, conciliatory, bulbous, three-dimensional, arduous, circumferential;

Gently, astern, aft

Ex. 2. Insert the right word:

Astern, temperate, clinker-built, template, overlap, immersed, dugouts, circumstances, consequences, rim, conciliatory

1. … were the first boats constructed by men. 2. In the case when the planks of the ship … one another, we say that the ship is … . 3. The captain commanded full speed … to stop the ship. 4. I can't work under such … . 5. Look at the … and try to do the same. 6. The … of the disaster may be serious. 7. This country is situated in a … zone. 8. The ship hit the rock and … into water. 9. To provide better stability you must … the cargo. 10. In this conflict he takes a … position.

Ex. 3. Change the words of italic type with their synonyms from your active vocabulary:

1. Bulky *equipment* was stored on deck. 2. The *shape* of this yacht resembles a flying bird. 3. The circulation of goods accomplished through this port is really *huge.* 4. For better maneuvering a ship hull must have a *bent* contour. 5. All parts of the structure were perfectly *balanced.* 6. *Canoes cut out from tree trunks* were probably the first boats designed by men. 7. The *curved* bow of this boat looks funny. 8. The essence of voting is *subjecting* of the minority to the majority. 9. This document has an *arbitration* character. 10. The economic *profit* of using a particular technology for constructing a ship depends on the number of ships in the series. 11. The *hard* working *conditions* associated with hot-forming have been largely eliminated. 12. Lofting operations and *making* of hull parts are done with aid of electronics. 13. The method of *mounting* the ship on the building berth must be decided upon in advance.

Ex. 4. Define in one word:

a) form or contours of an object;
b) a plate or screen preventing the passage of liquid or gas;
c) one of a horizontal surfaces dividing the ship's hull;
d) a rule, law or order;
e) a large flat piece of metal or wood that steers a ship;
f) a sudden unexpected increasing of wind strength;
g) smth very deep, having no bottom;
h) a high stern part of the top deck;
i) a hit over a coming wave
j) Method of jointing by which two plates (sheets) of metals can be connected together.

Ex. 5. Translate into Russian:

a floating city	closely resembled
fuel and provisions	a key development
to meet special needs	the keel's solid construction
safety regulations	the perfection in the design
to weld the metal plates	the result of slight changes
to form the middle section	overlapping planks
piece-by-piece manner	aft superstructure
prefabricated units	stability in a movement
to launch a ship	the conciliatory proposals
the squall heavy wind	stabilization of the hull
taking into account	reduction of wave resistance
capable of sea travel	prevention of slamming
hard iron tools	reduction of pitching

Ex. 6. Read and translate the text:

TEXT 5A

CONSTRUCTING A SHIP

A ship is one of the most complicated objects ever made. It is actually a floating city that generates its own power, heat, and electricity. A ship carries her own fuel and provisions. It can make her own fresh water from the sea, and she disposes of her own garbage.

All ships have four main parts: (1) the hull, (2) the engines, (3) the propellers, and (4) the rudder. In designing a ship, naval architects plan these and other parts of the vessel so that it meets a shipping company's special needs as well as government safety regulations. A shipyard then builds the ship according to the architect's plans.

Before naval architects begin to design a ship for a shipping company, they

must know how the firm plans to use the vessel. They must know where the ship will sail, what kind of cargo it will carry, and how fast it will have to travel. Architects also must be aware of government safety regulations. In addition, they must adjust their designs to allow for the ever-increasing use of automation on ships.

The shipyard carefully follows the architect's designs in building a ship. Traditionally, construction begins with the laying of the keel. Workers then build the ribs that support the hull and give it shape. Next, they weld the metal plates that form the middle section of the hull. As the middle section is built, the various compartments, the boilers, and the necessary machinery are added. Finally, the bow and stern are built, completing the hull.

Modern shipyards no longer construct ships in this piece-by-piece manner. Instead, they first build enormous prefabricated sections of the ship in subassembly shops. Many of these sections have some wiring and piping built into them. Giant cranes then carry these huge sections to a framework called a shipway, where they are welded together. There is no laying of the keel. As the double-bottom sections of the hull are welded together, the keel is laid automatically. The entire hull may consist of as few as 20 prefabricated units. After the hull is completed, parts of the superstructure are added. The ship is then ready to be launched.

Shipbuilders launch a ship after it is about 70 to 90 percent completed. The ship is slid down a runway of heavily greased timbers into the water. Most ships are launched stern first. A ship being launched bow first would plow down into the mud. Ships built along rivers too narrow for stern launching are launched sideways. Some yards build their ships in dry docks below the water level. After the hull and superstructure have been completed, workers open the valves and flood the dock. The ship then gently floats off the blocks that support the bottom of the hull. After the water inside the dock reaches the level of the water outside it, the dock gate is opened and the ship is launched.

Just before a ship is launched, it is christened. The shipping company selects a person, usually a woman, as the ship's sponsor. This person names the vessel and breaks a bottle of champagne across its bow. At that instant, the ship begins to slide

into the water.

After a ship has been launched, a tug pulls it to an outfitting pier. There, workers complete the superstructure and add the interior furnishings. The ship then makes its builder's trials with observers aboard from the company that ordered the ship. They make sure that all the equipment is in good working order and that the ship performs maneuvering, speed, and other tests according to the specifications. If the ship returns from the trials with a broom tied to the mainmast, it has made a "clean sweep" of its tests and the shipping company has accepted delivery of the vessel.

Ex. 7. Answer the questions:

1. Why can we call the ship one of the most complicated objects ever made? 2. What are the main parts of a ship? 3. What is the first step in ship designing? 4. What from does the construction traditionally begin? 5. What stages does the ship construction in piece-by-piece manner consist of? 6. How does the modern way of ship construction differ from the traditional method? 7. On what stage of construction is a ship launched? 8. Why are most ships launched stern first? 9. Where is sideway launching used? 10. What are the peculiarities of dry dock launching? 11. What is ship christening? 12. What does a broom tied to the mainmast mean?

Ex. 8. Try to summarize the main facts from the text in few sentences.

Revision.

For Independent Studying

Ex. 9. Read the text and recollect the basic principles of shipbuilding in different historical epochs.

TEXT 5B

EVOLUTION OF SHIPBUILDING

PART I

It is known that ancient ships were under construction by navigators and the designing of a new ship was always done, taking into account future mode and area of navigation. The ancient seafarer-shipbuilders had to give the much greater attention to safety of storm navigating, because rowing paddles are not suitable as movers even at temperate wave roughness, and the squall heavy wind the sail arms become into a source of serious danger. Much attention had to be paid also to the contours of the hull to give additional floatation and stability to the vessel especially in stormy conditions.

The basic features of contours of the hull, which provided storm non-sweep of the top deck, were following:

1) Low surface board that was not perceiving careening pressure of a wind, and wide hull ensuring good rolling stability;

2) Rounding form of the middle ship frames provided static rolling stability, and a low center of gravity allowed the hull easily to be kept on an inclined surface of a wave. It was necessary for maintenance non-sweeping of the middle top deck;

3) The narrowed and high V-figurative frames near of stern and astern promoted dumping of pitching. During pitching these frames pushed the water aside, creating dynamic conditions of non-sweeping on the bow and back decks;

4) The vessel was made symmetric concerning a bow and stern that was a main condition of non-resistance of sea wave phenomena. For keeping of a rate along of wave (i.e. along wave fronts - when the hull did not cross wave ridges), it appeared by sufficient effort of oarsmen on oars.

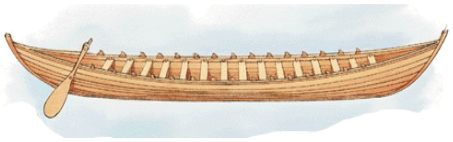
Such form of the hull well used properties of wind though the long storm at ocean made the unpredictable approach of a wave to the hull and complicated maneuvering with the purpose of evasion from a wave. Group character of wind excitement may cause large "crest of the tenth wave". It was necessary for helmsman to see to the hull of a vessel to be kept by along to a wave, keeping a

deck parallel of wave surface. Non-sweep of deck in this mode of navigation was provided, even if height of the "tenth wave" in some times exceeded height of the hull of a vessel. It was a fascinating and beautiful navigation, as the vessel could completely immerse in abyss, then for an instant appear at top of a wave perfectly safe!

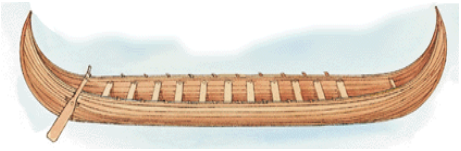
PART II

Pic. 19. Stone Age dugout

In Scandinavia canoes, or dugouts, capable of sea travel appeared in the Stone Age, some 7000 years ago. Their long narrow hulls became the basic design used for all northern ships up to and during the Bronze Age. By the Iron Age, some 2500 years ago, canoe design changed. Hard iron tools allowed ship builders to use planks and a clinker design. It proved so successful that it is still in use today. These boats, which the Viking design closely resembled, held twenty oarsmen and were very seaworthy. A century or two before the Viking Age began, a key development occurred in the design of ocean going open canoes that has lasted even into modern ship building times. It was the addition of a keel. The keel added greater stability to the ship and enabled it to travel straighter through the water than ships without keels. More importantly, the keel's solid construction gave the canoe the ability to carry a sail.



Pic. 20. Iron Age canoe of planks



Pic.21. Ocean going canoe

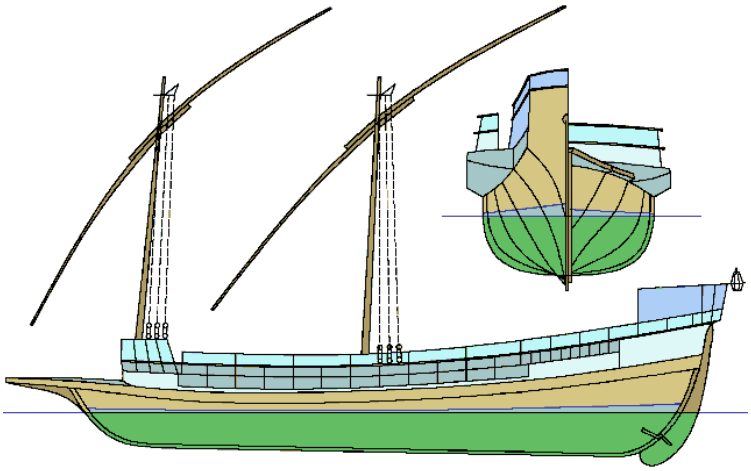
Pic. 22. Viking Dragonship

So, the perfection in the design, structure and materials used in Vikings ships was not the result of one shipbuilder or the work done in any one year of the

Viking Age. Like most technologies, it was the result of many years of improvements to an existing design. In the case of Vikings ships, it was the result of slight changes made over six thousand years that began with a simple Stone Age dugout. All the Viking ships were based on the same design: overlapping planks, solid keel, matching bow and stern and open deck.

PART III

For protection of trade vessels against pirates, Saxons in north, and Illirians in the south, Romans created easy and high-speed sailing-oar ships, liburnes, which are considered to be the prototype of Mediterranean galleys, existed up to XVIII centuries. The purpose of this project was to put achievement of the maximal speed, and as a consequence new operational requirement force seriously to reconsider the conception of seaworthiness and safety of navigation.



Pic 23. Mediterranean galley

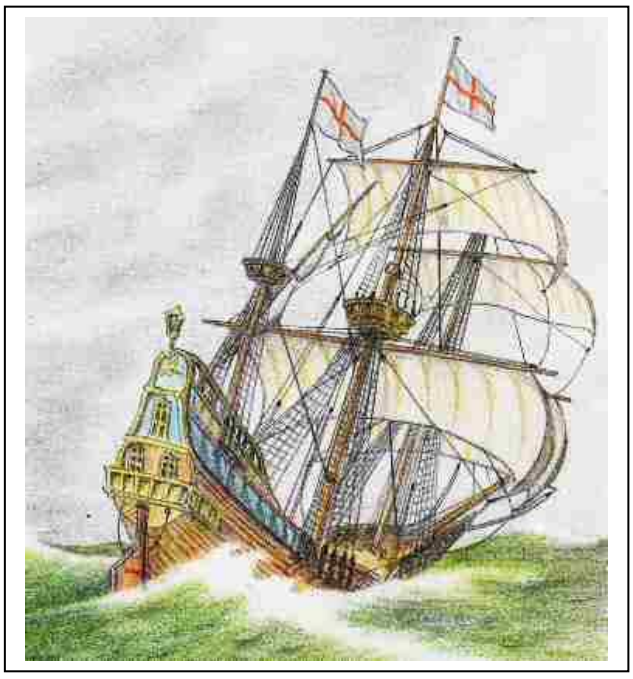
On Mediterranean galley bulb was already not present, as it obviously did not maintain test on propulsive quality and maneuverability of ship. In bow part of the hull the large completeness of contours was kept, and its components were made larger, as the absence of bulb essentially reduced stabilization of bow extremity and the aft superstructure. Thus, the opportunity of storming by a bow on a wave was kept on counter roughness and resulted in increase wave sweeping. Nevertheless, the ship builders reduced height of a bow deck and essentially increased sail surface of quarterdeck.

Trimming the hull by the stern, installation of sternpost and small completeness of concave branches of stern frames allow putting the center of board resistance of the hull on one vertical with the center of sail surface of Latin sails. It

is necessary for achievement of stability in a movement under sails and also makes effective work of stern rudder.

PART IV

Approach of epoch of great discoveries and colonial expansion can be characterized by construction of the ships in the best way adapted to long ocean navigation under sails. Taking into account the small tonnage of the ships of Columbus and Magellan, it is necessary to recognize true perfection of a ship science of that time, to note a harmony in a combination of the architectural and fluid-mechanics decisions; and also accuracy in laying-out of sailing arms and its complete conformity to features of hydrodynamics of the hull in conditions of navigation on roughness. Certainly, the crew of these small vessels could not completely rely on active use of sailing arms in an opposition with storm elements. Therefore determining role in maintenance of safe navigation again was played with the special form of the hull, where the contours and surface architecture provided a mode of the minimal interaction with energy of the storm sea.



Pic. 24. A full-rigged ship (XVII cent.)

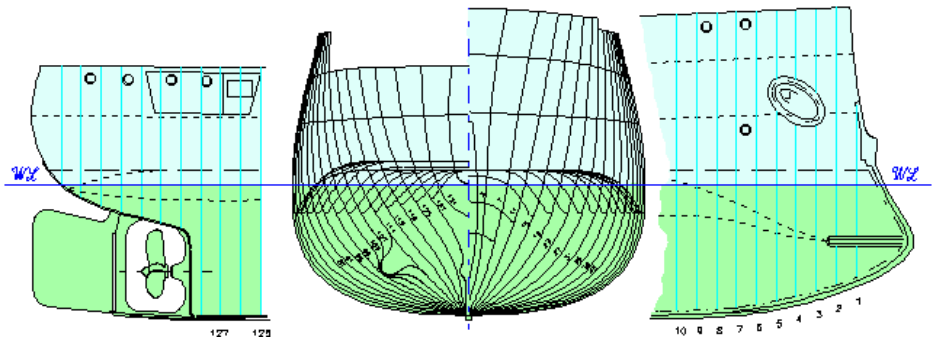
The advanced aft superstructure displaced the center of sail surface to aft, and large width and completeness of bow frames replaced a center of gravity and center of displacement in the bow part of the hull. Thus, on a wind the hull behaved similarly to "weather vane", providing storming by a bow on a wave without a going.

Equipment of sternpost and completeness small of stern frames had allowed putting the center of board hydrodynamic resistance on one vertical with the center of sails. It was necessary for achievement of a steady movement under sails, and also raised an overall performance stern blade of a rudder

For achievement stability the ratio of length of the hull to width (3:4) considerably decreased. Nevertheless, for the sailing ship there was no necessity in wide and continuous on length to a deck. The use of the push-off-waves boards and the division of a deck by superstructures, rising in an aft, excluded hit on a deck large on weight of amount of water, providing preservation storm stability. The same inside tilt of boards reduced risk of sweep of a deck at a course of the ship under sails and with a large rolling, and reduced forces of yaw, as the hull got vertical symmetry of a rather longitudinal axis which was taking place along a waterline. If at a sight in a stern part, medieval ship was soaring above water, allowing a wind to twist it without the special efforts, the bow part of the hull was heavy and deeply pressed in water. The shipbuilders of those times did not care at all about non-sweeping on going bow to waves. The unique protection was bowsprit, bowcastle and galune, which by first perceive a counter wave and deform its front, not allowing concentrating impact on bow deck.

PART V

In contours of the ships constructed at the end of the XIXth and in the beginning of the XXth century is possible to read of the conciliatory proposals between submission and an opposition before sea phenomena.



Pic.25. A cruiser hull design

Bulbous bow had continued to serve for stabilization of the hull and preservation of stability on a course in conditions of roughness. Especially it was important for high speed of a motion, that bulb favorably had an effect for reduction of wave resistance on calm water. Sharpening of extremities and small completeness of surface volumes in a bow and aft promoted fastness on roughness and favorably had an effect for reduction of pitching and prevention of slamming.

The narrow hulls of the ships were under construction for achievement of high speed of motion. Narrowed width of a deck served to the purposes of preservation storm stability in the sweeps conditions. The inside tilt of boards also reduced yaw during rolling that provided preservation of the given course and speed in conditions of storm roughness.

Rather low board and small surface of superstructures gave the possibility to conduct the ship even in conditions of strong winds.

Similar principles of hull construction are still in use nowadays, especially in naval shipbuilding.

Ex. 10. Answer the questions:

1. What had to be taken into account while designing an ancient ship? 2. Where was the greatest attention given by the ancient ship-builders? 3. Say in brief what the basic features of contours of the hull were. 4. What may group character of wind excitement result in? 5. What was the main task of a helmsman while maneuvering in storm conditions? 6. What for the narrowed and high V-figurative frames near of stern and astern used? 7. How was the rate along the wave kept? 8. What are the disadvantages of paddles and sails as movers? 9. What became the basic design for all northern ships in ancient times? 10. What allowed the shipbuilders to use planks and clinker design? 11. When did the first seaworthy ships appear in Scandinavia? 12. What key development allowed the appearance of ocean going vessels and has lasted even into modern times? 13. What design were all Viking ships based on? 14. What was undertaken for protection of trade vessels and with what purpose? 15. What was used to trim the hull of the medieval ships? 16. What could the ship crew rely on in conditions of navigation on roughness? 17. With what could the hull be compared on a wind due to its special construction? 18. What were the distinguishing features of medieval hull construction? 19. What was the traditional ratio of length of the hull to width? 20. What was considered to be the unique protection against the waves on the full-rigged ships? 21. What

conciliatory proposals can be seen in contours of the ship constructed in the beginning of the XXth century? 22. What did the bulbous form of a bow serve for? 23. How did it appear to be possible to promote fastness and reduce pitching and slamming? 24. What helped to conduct the ship even in conditions of strong winds?

Ex. 11. Explain why:

a) the ancient seafarer-shipbuilders had to give great attention to safety of storm navigating and to the contours of the hull;
b) the hull had to be wide with low surface board;
c) the middle ship frames had a rounding form;
d) the vessel was made symmetric;
e) we can say that it was a fascinating and beautiful navigation;
f) the invention of keel allowed the appearance of ocean going craft;
g) there was a necessity of creation of easy and high-speed sailing-oar ships in the Mediterranean;
h) the medieval shipbuilders rejected the idea of hull bulb;
i) it was necessary to trim the hull and to raise the center of board resistance.
j) the epoch of great discoveries and colonial expansion caused great changes in ship construction;
k) medieval ship was soaring above water, if at a sight in a stern part;
l) the shipbuilders of those times did not care at all about non-sweeping on going bow to waves.
m) the hulls of the ships were made narrow in the beginning of the XXth century;

Ex. 12. Develop the idea:

1. Ancient ships were constructed by navigators themselves.

2. The basic features of contours of the ancient ship hull provided storm non-sweep of the top deck.

3. There were no essential changes in ship design until the XVth century.

4. The hull construction played a very important role in further reliability of a ship.

5. A stern part of medieval ship was soaring above water, while its bow was deeply pressed in it.

6. The conciliatory proposals between submission and an opposition before sea phenomena were followed in contours of the ship constructed in the beginning of the XXth century;

Ex. 13. Complete the sentences translating the missing parts into English:

1. *Строительство судов в Скандинавии началось* long before the Vikings came. 2. *Этот дизайн оказался настолько успешным* that it is still in use today. 3. These boats *очень напоминали корабли викингов*. 4. It was the result of *многолетних усовершенствований и незначительных изменений* made over six thousand years. 5. The Vikings built *корабли различных форм и размеров*. 6. *Целью этого проекта ставилось* achievement of the maximal speed. 7. The ship builders reduced *высоту носовой палубы* and essentially increased *площадь парусов в кормовой части*.

Ex. 14. Speak on the different stages in ship construction.

Ex. 15. Read the text:

TEXT 5C

MODERN PRINCIPLES OF SHIPBUILDING

Ships are extremely complicated engineering structures, subjected to high alternating loads and supported by a liquid medium. This circumstance, and the diversity of component parts in the equipment of a ship, explain why ship design is

so complex and why high requirements are made of the materials and technological processes employed in ship construction.

In modern shipbuilding, the principal technological problems in constructing a ship (or a series of ships) are solved in the design stage. The materials and structure of the hull envisaged in the designs must satisfy the technological requirements. The following must be decided upon in advance:

(1) the optimum subdivision of the hull into sections (or blocks);

(2) the method of assembling the ship on the building berth;

(3) the sequence in which the hull is to be assembled and welded in every stage of construction;

(4) the extent to which sections (or blocks) should be completed before placing them in position on the building berth, so that the optimum amount of work is performed beforehand;

(5) the combined sequence of hull and fitting operations;

(6) the degree of completion of the ship before launching;

(7) the amount and sequence of work left to be done after launching (afloat);

(8) the economic advisability of using a particular technology for constructing a ship depending on the number of ships in the series.

When the working drawings of the hull structures are being produced, serious attention must be paid to reducing wastage of materials as far as possible; there must be the maximum standardization of units and components, and provision must be made for mechanization and for using the most advanced technological processes at every stage in constructing the ship (for instance, the maximum use of automatic welding). All the measures employed must lead to reducing the amount of work on marking-off and fabrication of components, assembling and welding the hull structures, etc., and on improving the conditions for this work, reducing its cost and raising its quality. ,

The basic work of shipbuilding is performed in the 'following sequence:

(1) the lines of the ship are laid-off (full size) in the mould loft, or (to scale) in the lofting office; the templates, patterns, etc., are made;

(2) the hull components are marked off on the metal, or set out on template drawings and optical templates if scale lofting is used;

(3) the hull components are fabricated (machined);

(4) the flat elements (members) and subassemblies are assembled and welded;

(5) the flat and volumetric sections are assembled and welded, and the necessary installation work on them is done;

(6) the sections are fitted up together on the building berth, the welds made, and the installation work in the region of the butt joints is done;

(7) the structure is tested for leaks;

(8) the ship is launched or floated out;

(9) fitting out is performed afloat (the amount of this work should be reduced to a minimum);

(10) delivery trials are performed.

Shipyards now have much experience of cold-forming the shell plating in powerful presses (250-2,000 tons). The cold-forming of plates has meant that the cumbersome and expensive furnaces are no longer required in the hull prefabrication shop, and fuel saving can be made. The arduous working conditions associated with hot-forming have been largely eliminated. The labour required for cold-forming is 60-72% less than for hot-forming.

In a buffer store the metal is sorted and transported to the prefabrication shop (areas for assembling and welding structural members). From the flat elements (structural) and separate plates, subassemblies are made; from the subassemblies and panels complete sections are produced. The flat and three-dimensional sections are assembled and welded to form block-sections. At the same time the sections (block-sections) are being fabricated, they are also fitted out in the prefabrication shop. Sets and assemblies of fittings are obtained from fittings and equipment shops. When the fitting out operations have been performed on the block-sections, i.e., the large three-dimensional sections of the hull (with the circumferential butt joints parallel to the midship plane) and of the superstructure, these block-sections are called blocks.

At modern shipyards, lofting operations and the prefabrication of hull parts are done with the aid of computers and electronically controlled machines, which means improvement in the quality of the work done at every stage in the building of a ship, also reduction in work times, labour and costs.

Ex. 16. Match the words with the same meaning:

construction	degree
stage	producing
extent	difficult, hard
do	installation
assembling	level, position
shipyard	perform
fabrication	fitting up
arduous	building dock
installing	adjustment

Ex. 17. Match the definition with a term:

Building berth; the design stage; ship; fabrication; hot- forming; cold-forming; blocks; welding; shipyard/ building berth/ building dock

1. The process of preparing and making of the hull components.
2. The way of creating the shell plating, where the cumbersome and expensive furnaces are not required in the prefabrication shop.
3. The process of creating the shell plating, where the required labour is 60-72 % more.
4. Complex engineering structure, subjected to high alternating loads and supported by a liquid medium.
5. A place where all the operations (processing, fabrication, welding, assembling) are performed to their complicated construction.
6. Method of solving of the principal technological problems in constructing a ship.

7. Place for constructing and repairing a ship.
8. The large three-dimensional sections of the hull or of the superstructure.

Ex. 18. Insert the words according to the text:

1) After lofting operations and the templates and patterns are made, the hull components are … on the metal.

a) assembled; b) cut; c) mark off.

2) When the hull components are fabricated, the flat elements and subassemblies can be … .

a) assembled and welded; b) erected and installed; c) marked off and fabricated.

3) Then the whole sections are … together on the building berth.

a) fabricated; b) fitted up; c) performed.

4) After welding has been made, the … work in the field of the butt joints is done.

a) drawing; b) measures; c) installation.

5) The amount of work should be reduced to a minimum when the ship is launched or floated out and … must be performed afloat.

a) welding; b) assembly; c) fitting out.

Ex. 19. Answer the following questions:

1) What are ships? 2) What can complexity of ship design and high requirements to the materials and technological processes employed in ship construction explain? 3) How can the principal technological problems in shipbuilding be solved? 4) Must the materials and structure of the hull envisaged in the designs satisfy the technological requirements? 5) What must serious attention be paid to when working drawing of the hull structures are being produced? 6) Say, whether the maximum standardization of components and provision for mechanization and for using the most advanced technological processes at every stage in constructing the ships must be made? 7) What is the difference between cold- forming and hot-

forming the shell-plating? 8) How can the nowadays lofting operations, fabrication of hull parts and other operations be performed and checked?

Ex. 20. Explain what is:

a) marking off the metal;
b) a buffer store;
c) prefabrication shop;
d) cold- forming method the shell- plating;
e) hot- forming method;
f) working drawing of the hull structures;
g) a ship.

Ex. 21. Report on:

a) preparation work (at the design stage) ;
b) methods of shell- plating;
c) the sequence of all operations in different shops of the shipyards.

Ex. 22. Speak on the topic "Shipbuilding and Its Principles"

UNIT VI
SHIPBUILDING TECHNOLOGIES

Ex. 1. Read and translate the words. Include them into your vocabulary:

Rigidity, casting, shell, designation, bulwark, keelson, stringer, girder, beam, bracket, strap, forepeak, afterpeak, carling, tweendeck, bilge, strake, margin, garboard (strake), coaming, sequence, drawing, jig, accuracy, layout, deviation, ambiguity, trolley, verification, bracing, fitting, hoisting, awning, tarpaulin, sleeve, circuit, outlet, handover, desalination, grinder, feeler, gauge, template, stud, absorber, berth, drum

Collapse, immerse, sustain, subdivide, secure, sheer, dispatch, alter, amend, retard, weld, comply, align, mill, mount

Partial, external, outward, transverse, conducive

Properly

Downwards, upwards, amidships

Ex. 2. Insert the right word:

Subdivided, accuracy, drawings, downwards, welded, sequence, immersed, upwards, beams, collapsed, rigidity

1. All the measures must be taken in a proper … . 2. Every part of this text can be … into smaller passages. 3. This device is of very high … . 4. Escalators are used to ease people's moving … and … . 5. The deck is placed over strong deck … . 6. In a couple of hours the ship … almost completely. 7. Technical … are the basis of any construction project. 8. The metallic parts must be … together to ensure the … of the structure. 9. During the storm some pillars were damaged and the central part of the bridge … into the water.

Ex. 3. Change the words of italic type with their synonyms from your active vocabulary:

1. The government *supported* the idea of fleet modernization. 2. The *cross* section of this part has a triangular shape. 3. Various cargoes can be transported in a *hold*. 4. The weather conditions were rather *favourable* for the voyage. 5. The *edge* of the tank was deformed and the cover became leaky. 6. The *skeleton* of a rusted boat spoils the shore view. 7. His *appointment* as a captain was settled long ago.

Ex. 4. Define in one word:

a) a sort of a fence bordering the deck; board continuation;
b) wheeled table or basket;
c) space between the decks;
d) smth abnormal, not corresponding;
e) a plan, scheme or design;
f) to go underwater; to sink;
g) smth uncertain, indefinite or vague

Ex. 5. Translate into Russian:

the principle part	methods of performance
properties of the materials	necessary auxiliary work
an established sequence	technical facilities
welded structures	productive capacities
basic delivery requirements	permissible deviations
a general description	the chief engineer
manufacturing shops	purchasing organization
dimensional accuracy	separate branches of production

Ex. 6. Read and translate the text:

TEXT 6A

TECHNOLOGICAL PROCESSES OF SHIPBUILDING

This term covers the principle part of the production process concerned directly with changing (by means of tools, equipment and fittings) the dimensions, shapes, outward appearances and properties of the materials in such a way as to make them into the separate parts of the hull, machinery and equipment, also with assembling all these parts and the units and plant made from them, in an established sequence, to form the finished ship.

The technological process and the technological requirements made of structures (particularly welded structures) have now become much more complex, and the shops cannot do good quality work from drawings alone. At the same time, therefore, as the working drawings are issued, special documents must also be produced; these must indicate, for all the operations in the technological process, the methods by which the work is to be done and the sequence for its performance, the jigs and tools to be used, the special training required by the workers, the labour required for operations, the time which they should take, and where they should be performed, also the basic delivery requirements. These specifications, which are also called the "technological processes", are despatched to the shops, which must comply with them.

Special technological offices are organized at shipyards for working out these technological processes.

The documents produced by the technological office must include the following:

1) a general description of the structure to be produced and a list of the drawings (both general and working);

2) a list giving particulars of the parts making up the structure (numbers, dimensions, weights, materials, etc.);

3) a list of the following for each component: the operations required to produce it; manufacturing shops; machines, tools and jigs; sequences of operations; requirements as to the dimensional accuracy of the components and joints between them;

4) recommendations regarding the layout of working positions and their preparation;

5) a list of all the operations subdividing them as to complexity and methods of performance;

6) subdivision of operations by separate branches of production, for the purpose of which all the operations to be performed must be defined and indicated;

7) enumeration of the necessary auxiliary work, under all branches of production and operations, indicating labour requirements and amounts of additional materials required;

8) technical specifications for regular verification of the quality of all operations in the fabrication of components and structures, and for the provision of supplies for working positions (indicating the procedure for accepting finished products, permissible deviations, etc.).

In every case the technological process must be the most convenient possible working process, also the most simple; it must be worked out objectively, taking into account the technical facilities for production, the shop equipment, and the productive capacities of the shops at the shipbuilding establishment; the products must be of the required quality. There must be no ambiguity in the wording of any of the points in the technological processes.

The technological processes must be agreed in advance with the technical staffs of the shops, and also approved by the chief engineer of the establishment. Before approval they must be agreed with the "design office", representatives from the purchasing organization, and the Technical Inspection Department of the shipyard. Once it has been approved, the technological process cannot even be partly altered

by the shops unless this is agreed with the technological office and approved by the chief engineer.

The technological processes must also include the methods by which they can be amended, and the methods of doing this and the places where it may be done must also be indicated.

Ex. 7. Answer the questions:

1. What does the term technological process mean? 2. What should be included into the required special documents? 3. What is organized at shipyards for working out technological processes? 4. What kinds of documents must be produced by the technological office? 5. What must be included into a list for each component? 6. What is meant under particulars of the parts making up the structure? 7. What is the main requirement to the technological process in every case? 8. What is to be taken into account during the technological process? 9. Who must the technological processes be agreed with and approved by? 10. Can the technological process be changed by the shops in working order?

Ex. 8. Agree or disagree with the following statements. Give grounds to your answer:

1. The technological processes concerns some separate particular parts of the production process. 2. The drawings alone can be enough for the production process. 3. Special documents cover all the aspects of the process. 4. The terms “specifications” and "technological processes" means practically the same. 5. Auxiliary work cannot be included into the technological process. 6. Accepting finished products is also the part of the technological process. 7. The chief engineer of the establishment gives the final approval of the process. 8. This approval leaves a

certain freedom in maneuvering for the shop. 9. The methods and places of the future work must also be included into the documents.

Ex. 9. Define the main topic and idea of the text, split it into the logical parts, make up the plan of the text.

Ex. 10. Abstract the text in 5-6 sentences.

Ex. 11. Read and translate the text paying special attention to the illustrative material:

TEXT 6B

HULL WORKS

PART I: GENERAL OUTLINE OF HULL CONSTRUCTION

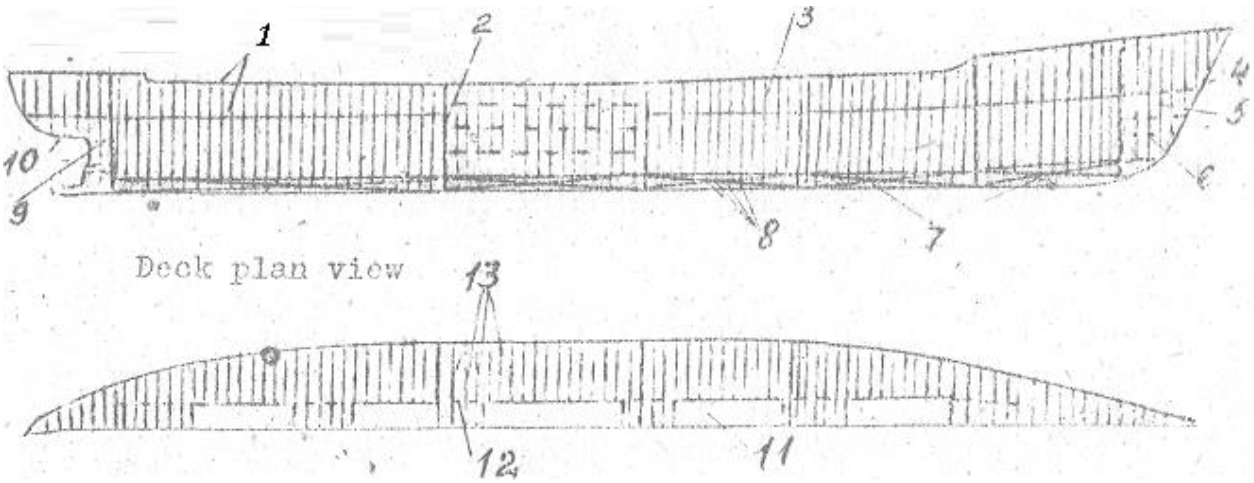
In any kind of vessel the principal problem is the hull construction corresponding to strength and rigidity requirements. The hull of going vessel must withstand water pressure tending to collapse it from sides, while the heavy masses of cargo together act from inside. These cargo masses with the hull weight directed vertically downwards tend to immerse the hull into water, while water sustaining forces directed vertically upwards tend to force it up. Thus being subjected to the diametrically opposite forces the hull tends to bend longitudinally: in addition stresses caused at rolling display tendency to transverse section deformation.

When grounding or resting in dry deck the hull is subjected to new stresses from machinery and engine room operation. Thus the principal stresses to which the hull of a vessel is subjected depend on the longitudinal bending of the hull overall, its transverse deformation and various stresses acting in different parts of a vessel. The hull construction therefore must be strong and rigid enough to withstand all indicated stresses.

The hull is subdivided into the following main parts:

1. Hull.
2. Superstructures.
3. Subdivision members (compartments, castings).

Let us examine the main parts of the hull.



Pic. 26. General arrangement of framing

1. Deck; 2. Transverse bulkhead; 3. Side frame; 4. Stem; 5. Forepeak; 6. Side stringer; 7. Double bottom; 8. Floor; 9. Afterpeak; 10. Sternpost; 11. Hatch; 12. Carling; 13. Deck beam

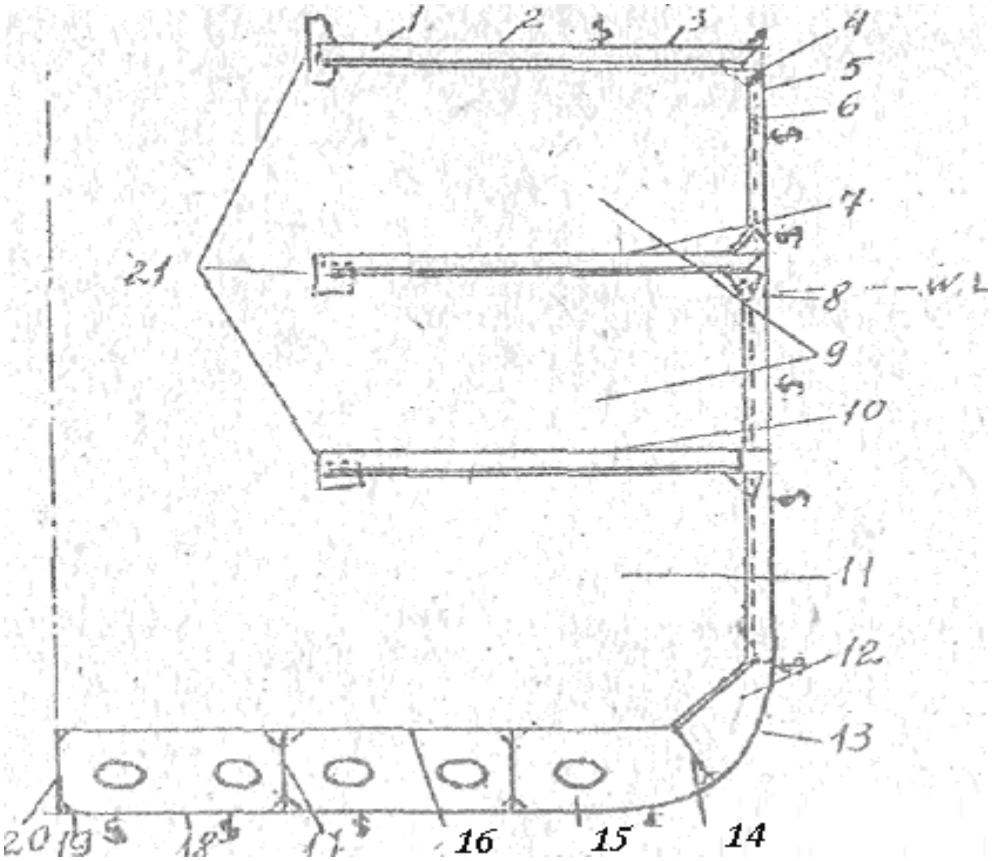
Properly the hull consists of the framing and shell. The shell is subdivided into a bottom shell, side shell and deck plating. The framing and the shell are the main structural members of the hull. They include the following members:

a) bottom framing and shell;
b) side framing and shell;
c) deck framing and deck plating.

Typical superstructures are:

1. The forecastle in the forward part of the ship which begins from stem;
2. The bridge is located amidships. The designation of the bridge is to protect the ship from getting water through openings in the machine and other castings.
3. The poop is a superstructure in the aft to protect the rudder arrangement and to cover the machine and boiler castings if they are arranged in the stern.

The space between all these superstructures of the upper deck is usually protected by with bulwarks.



Pic.27. Section of dry cargo ship

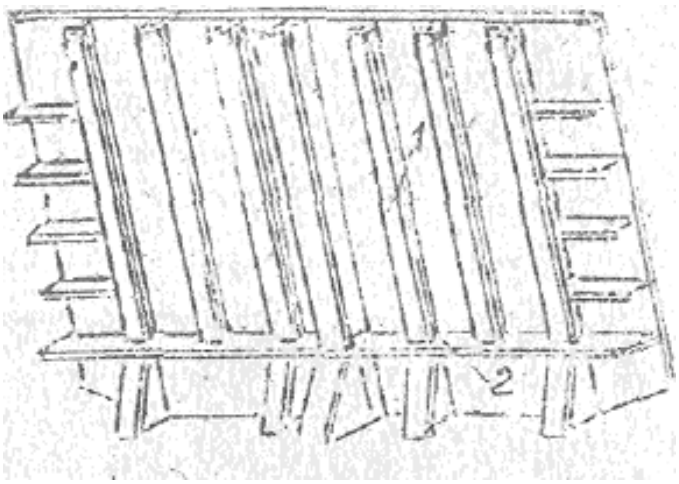
1. Deck Beam; 2. Upper deck plating; 3. Deck stringer; 4. Beam knee; 5. Sheer strake; 6. Frame; 7. Second deck plating; 8. Ice strake; 9. Tweendeck; 10. Third deck plating; 11. Hold; 12. Bilge bracket; 13. Bilge strake; 14. Margin plate; 15. Floor; 16. Tank top; 17. Keelson; 18. Garboard strake; 19. Flat plate keel; 20. Vertical keel; 21. Side hatch coaming

Subdivision members of the ship serve to provide unsinking of the ship, fire- proof safety and the strength of the ship. Subdivision members are accomplished with the arrangement of decks and partial decks and with the arrangement of transverse and longitudinal bulkheads. They make compartments of the two kinds: decks of the hull and decks of the superstructures. Decks of the hull are as follows: (1) upper deck, (2) middle deck, (3) lower deck and (4) platform.

The decks of superstructure are the following: (1) bridge deck, (2) lower promenade deck, (3) upper promenade deck and (4) boat deck.

Taking into consideration all this the hull construction of a modern vessel is composed of (1) longitudinal framework, keel, keelsons, stringers, deck girders,

longitudinal bulkheads, hull and deck plating; and (2) transverse framework, beams, transverse bulkheads, wooden deck, etc.



Pic. 28. Transverse bulkhead:
1 – stiffener; 2 – shelf plate

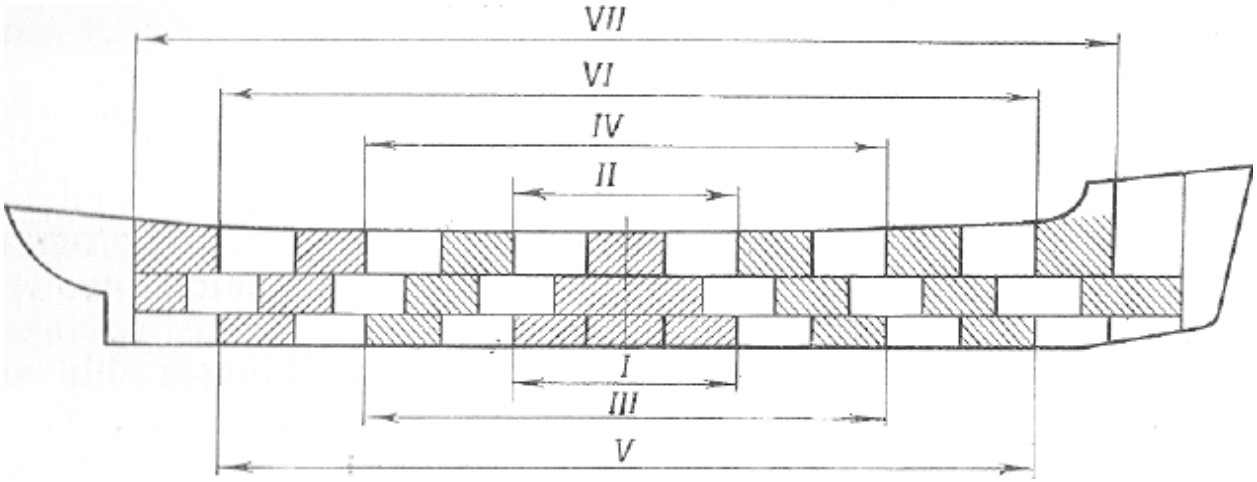
As for the external shell plating and deck plating they also stiffen the hull transversely. At interconnections of longitudinals and transversals additional ties are introduced such as in the form of brackets and straps.

Rigidity stability and permanent depth of hull is guaranteed by floors, side plating longitudinal and transverse bulkheads as well as by pillars. Local rigidity at the ends of the hull is also secured by stem and stern.

PART II: SELECTION OF METHODS OF HULL SHAPING

1) *Pyramid method of building up hulls from prefabricated sections.*

When the pyramid method is used, building up the hull on the building berth starts with the assembly and welding of the first pyramid, with the sections in the subsequent pyramids butt-assembled to it. The entire hull is assembled and welded successively forward and astern from the centre of the prefabricated bottom section of the first pyramid, and to the sides and upwards; this ensures that there is free contraction while welding sections, and consequently reduces the total hull deformations. When the first pyramid has been assembled and welded, although it is comparatively short, its section relative to the horizontal axis is already sufficiently rigid.



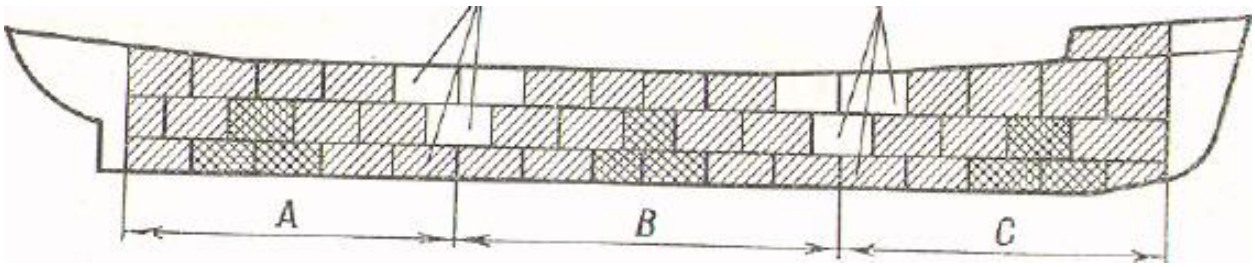
Pic. 29. Pyramid method: I-V11—pyramid Nos.; the sections for pyramids I, III, V and VII are shaded

This method gives the hull its initial shape as to transverse cross-section (in breadth and depth), but formation in length is somewhat retarded; extension of the working front in the first stage of assembly on the building berth is thus limited.

This method has been given the name "pyramid" since seen from the side the assembled part of the hull represents a pyramid with the terraces formed by the outlines of the individual sections. When the first pyramid has been completely welded, the sections forming the next pyramids are assembled and welded simultaneously, and the fitting-out and installation work is at the same time done in the finished sections of the first pyramid. With the completion of welding on each successive pyramid, fitting-out and installation operations are carried out on an increasingly wide front.

2) *The "island" method of building up the hull from sections.*

The working front can be further extended by using the "island" method of assembly; when this method is used, sections are simultaneously placed in position at two or three zones along the hull (for instance, at the midship, bow, and stern zones). In many cases the sequence of assembly and welding within each island may be the same as with the pyramid method. As soon as welding is finished in each island, fitting-out and installation operations are begun.

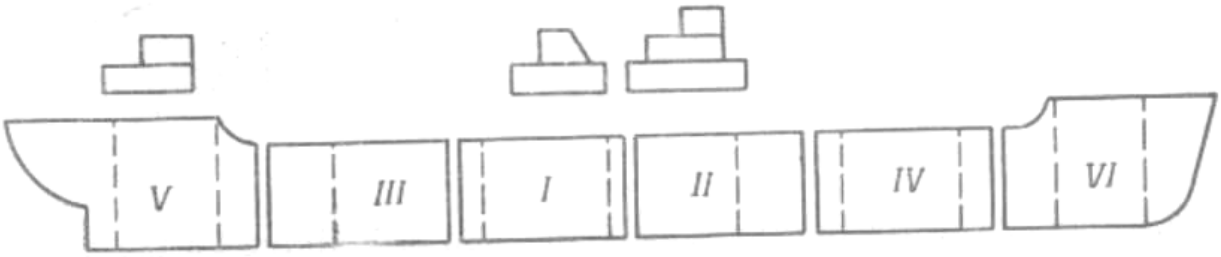


Pic. 30. The "island" method: A, B and C—the stern, midship and bow islands; the sections for the initial pyramids in each island arc shown by the criss-cross shading

There may be two, three or more islands, depending on the type, size and design of the ship, also on a number of other factors. The difficulty of building a hull by this method lies in joining the islands together. If the islands are assembled on movable trolleys, they can be joined together by moving the trolleys. If the islands are assembled on keelblocks, connecting sections should be installed along the entire perimeter of the hull to join the islands together.

3) *The block method of hull construction.*

When hulls are constructed by the block method, the building berth assembly cycle is reduced to a minimum, and the welding deformations are also minimum. In the block method the "blocks" (completed parts of the hull



Pic. 31. The block method: I-VI – hull blocks Nos., in the sequence of installing

between sections parallel to the midship plane) are assembled from previously fabricated sections in which installation work has already been done. The finished blocks are despatched lo the building berth, where they are butt-assembled; the installation work in the regions of the butt joints is then completed.

The first block to be placed into position is the base block(in the centre) ; when its position has been checked and it has been fixed on the building berth the

neighbouring blocks are joined to it, either one at a time or both at once. If there are a large number of blocks it is sometimes effective to join them in groups of two or three, and then to join two groups (symmetrically) to the base group.

Ex. 12. Revise the terms from your active vocabulary.

a) Using the definitions, rearrange the letters to find words used in the text:

PGITANL	1. the hull's shell;
ASTRELEFOC	2. the superstructure erected at the forward end of the ship;
BEGIRD	3. the superstructure erected about amidships;
WARBULK	4. the strake of shell plating which serves as a quard against losing deck cargo or men overboard;
LAKDEHUBS	5. the vertical watertight partitions;
SOFORL	6. the transverse girders stiffening the bottom plating;
RINGMAF	7. the girderwork stiffening the hull;
RESTGIRNS	8. the longitudinal girders stiffening the side plating;
ONESKLES	9. the longitudinal girders stiffening the bottom plating;
STOPNREST	10. the rigid structure at the stern.

b) Match the words with their definitions:

The forward end of the hull	longitudinal bulkheads
The after end of the hull	the bottom
The lowermost part of the hull	the poop
The topping part of the hull	the stern
The wall of the hull	side frames

The hull's shell	the forepeak
The superstructure erected at the after end of the ship	side stringers
The transverse girders stiffening the side plating	the plating
The longitudinal girders stiffening the side plating	the deck
The foremost compartment	a side
The bulkheads erected fore and aft	the bow

Ex. 13. Match the pairs of

a) synonyms:

dispatch	original
reduce	connect
advantage	perform
transverse cross-section	send
entire	guarantee
contraction	minimize
ensure	whole
do	virtue
initial	longitudinal cross-section
join	setting

b) antonyms:

increase	contract
rigid	speed up
join	reduce
assemble	soft
retard	divide
extend	dissemble

Ex. 14. Answer the questions:

1) What is the principal problem for all kinds of vessels?
2) What do the stresses (to which the hull of a vessel is subjected) depend on?
3) How many and what main parts does the hull consist of?
4) What is the designation of the bridge?
5) What is the main designation of subdivision members of the ship?
6) What structural members is the hull composed of?
7) What can guarantee the rigidity stability and permanent depth of hull?
8) What does the building up the hull of a ship start with when the "pyramid" method is used?
9) What reduces the total hull deformation in the case of such method?
10) What is the position of the bottom section of the first pyramid to the horizontal axis?
11) Why is extension of the working front in the first stage limited?
12) Can the "island" method of assembly conducive the further extension of the working front?
13) Are sections simultaneously or successively placed in position in this method?
14) What is the arduous point of building a hull by "island" method?
15) What method of construction permits to reduce the building cycle and welding deformation to a minimum?
16) Are the blocks in the block method assembled from sections with ready installation works or is the installation work done simultaneously when butt-assembled?
17) What makes easier the butt-assembly of the blocks in such method?

Ex. 15. Say, whether the following statements are true or false:

1) The prefabricated bottom- section is the beginning of building up the hull with the section in the subsequent pyramid butt-assembled to it.
2) The first pyramid is comparatively short.
3) The hull in the pyramid method is assembled and welded forward and astern from the central (bottom) section, and to the sides and upwards.
4) The disadvantage of the pyramid method is that the initial shape of the hull is developed in breadth and depth, but formation in length is slower.
5) By using the" island" method sections are simultaneously placed in position at the stern, midship and bow zones.
6) The advantage of building a hull by the "island" method lies in joining the islands together.
7) The block method of hull construction possesses the virtue to minimize the building berth assembly cycle and welding deformation.
8) The blocks are assembled from preliminarily produced sections with completed installation works.
9) The finished blocks are delivered to the building berth where they are butt-assembled; the installation work in places of butt joints is already completed.
10) The principal disadvantage of the block method is that the hull assembly period and shipbuilding cycle is shorter.

Ex. 16. Insert the proper words in the text:

(Block, stern, hull construction, consisted of, pyramid, bow, building berth, island)

The … method of … was introduced when assembly in large prefabricated sections was first being used; it is now widely for medium and large ships. For instance, the hull of the atomic icebreaker "Lenin", which … 161 sections weighing up to 80 tons, was constructed on the … by such method (with certain priorities in assembling the stern sections); this meant that installation work in the machinery compartments could be performed at the same time as … and … assembly were been completed.

Ex. 17. Using the corresponding pictures from the text report on:

a) pyramid method;
b) "island" method;
c) block method.

Ex. 18. Read and translate the text:

TEXT 6C

INSTALLATIONS

1) Hull Installation Work:

The term "installation or fitting out work" means the combination of very wide range of different operations included in equipping and fitting out ships, performed after the principle hull structures have been assembled and welded. This work includes: the installation of light partitions, bulkheads and various types of bracing, the painting and insulation of the ship, the installation of the machinery, systems and devices, the equipment of the accommodation and quarters, etc.

The first stage in the work of installation on a ship is installing fittings in the sections. This enables the work to be carried out by parallel method, with the installation work commenced at an early stage in building the ship.

With modern methods of shipbuilding the installation of fittings (rudder, anchor and hoisting equipment, boat handling gear, towing and mooring equipment, handrails, etc.) begins while sections are being fitted up and welded, and the most of the work is performed on the building berth.

Installing of the systems on a ship includes piping, machinery and instruments for moving liquids, steam or air, and controlling their temperature, pressure and so on. For that there are many different technologies (depending on the purpose and location of the systems), so the general sequence of the operations may be established as following:

a) cutting of holes and installation of unions and sleeves;
b) the construction of distance pieces, dismantling, washing, assembly and testing;
c) installing the machinery, instruments and connecting sections of piping from the main line;
d) testing the system as a whole.

The rigging and sailmaking work is done by the rigging shop as follows: making and installing the standing and running rigging, stepping the masts, assembling the anchor fittings and installing the rigging of the boat handing gear. The shop also prepares and assembles the launching devices, and carries out all loading and unloading work.

The sailmaking work consists of producing awnings, tarpaulins and sails (for sailing vessels and life-boats), covers for deck machinery, gear and instruments, flags, life-jacket cases, stair carpets, curtains, etc., and installing all these on board ship. The sailmaking work can also include the preparation of materials for insulating piping.

When all metal parts have been assembled, welded and fitted they are specially treated to protect them against corrosion.

2) Electrical Installation:

Every year the amount of electrical equipment on all types of ship, and the amount of electrical installation work performed during their construction, are increasing. Automatic control and mechanization are developing rapidly, and there are excellent prospects for using electric drives on a large scale and for the complete electrification of machinery and fittings on ships.

Tens of kilometers, and in large ships hundreds of kilometers, of cable are used for connecting up the great number of different types of plant, apparatus, receiving and transmitting devices and instruments at different points on board ship. Immense numbers of adapters, bridges, panels, brackets, packing boxes, cable boxes and pipes, installation frameworks, and different types of fastening device have to be made and installed for the purpose of laying the cables. A great numbers of foundations, frames, brackets, supports, outlets, etc., also have to be made and installed to take the different types of plant, apparatus, receiving and transmitting devices and instruments.

Tens of thousands of cable ends have to be separated, marked, fixed, channeled, insulated and earthed in order to create the closed electrical circuits. The total amount of work involved in installing the electrical equipment now amounts to about 10% of all the work in building a ship.

The work of installing all the electrical equipment on ships is carried out by the main shops at the shipyard, and by shops at special undertakings called electrical installation undertakings.

The work of equipping a ship electrically is subdivided into the following periods or stages:

(1) Preparatory work in the shops;

(2) preparatory work on board ship;

(3) external assembly of electrical equipment;

(4) internal assembly of electrical equipment;

(5) protection of wireless receiving stations from interference, and their earthing;

(6) preparation of electrical circuits for handover;

(7) handover tests.

3) Installation of the Auxiliary Machinery:

All shipyards are equipped with powerful cranes for shipbuilding by the large prefabricated section method is a fact in favour of the introduction of integrated methods of installing mechanical equipment, for plant of practically any weight can be handled.

According to the method by which it is installed, the auxiliary machinery can be subdivided into four categories:

1) machinery supplied to the ship in the form of individual complete assemblies; these have to be aligned on the ship and fixed to the foundations on wedges (for instance, the steering machinery);

2) machinery including power and working units in the same housing (for instance, turbine and electric pumps);

3) machinery mounted on one foundation frame by means of which it is connected to the ship's foundations (diesel generators, diesel compressors, etc.);

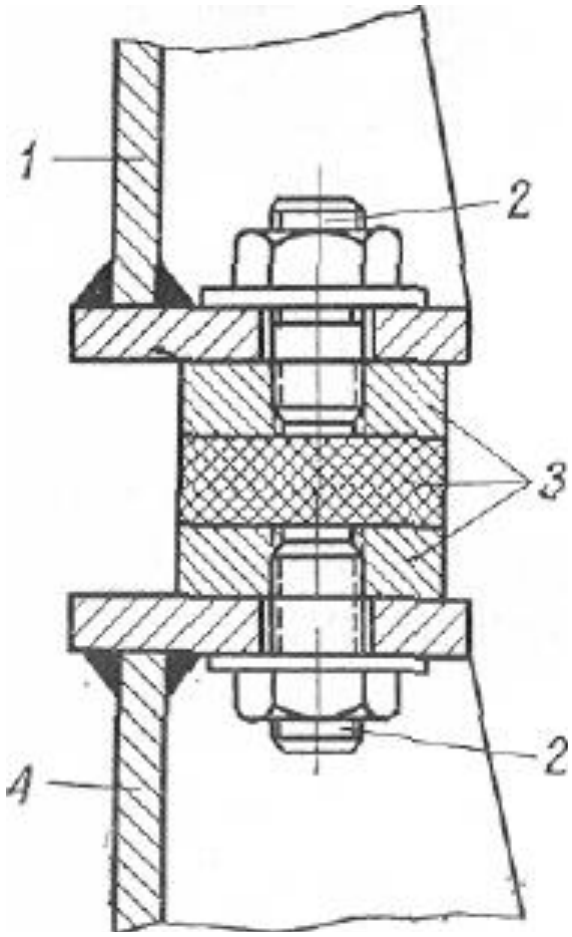
4) machinery with no moving parts (ejector pumps, filters, evaporators, desalination plant, condensers, etc.).

Before the auxiliary machinery is installed a check is carried out to ensure that the foundation for the machinery is correctly positioned relative to the base planes and that the dimensions of the supporting surfaces correspond to those shown on the drawings.

The supporting surfaces of the foundations for machinery in the first and second categories are machined using portable (pneumatic) grinders or milling machines, and are filed to a checking template in the same way as the foundations for shaft-line bearings or the main propulsive machinery. Machinery in the first category is aligned by straight edge and feeler gauge, or by indicators, and then mounted on steel wedges or spherical spacing pieces. Machinery in the second category is installed without wedges directly on the machined supporting surface of the foundation, to which it is bolted. If the drawings prescribe that the machinery must be in some particular position relative to the supporting surface of its foundation, machinery is mounted on steel spacing pieces of the required thickness.

Machinery of the third and fourth categories is usually mounted on hardwood spacing pieces (oak, ash or teak), and the supporting surfaces of the foundations are not machined, merely dressed. The wooden spacing pieces made in the shop, with an allowance for adjustment on the spot. The spacing pieces are fitted to the dressed supporting surface of the foundation and set in position on studs. The upper surfaces of the spacing pieces are planed, and their locations relative to the base reference plane checked by means of water levels and straight edges. The bolt holes are drilled in the foundation using a template taken from the frame or base of the machinery. The holes are marked on the spacing pieces, using the same template, and then drilled by machine. Before being finally placed in position, the spacing

pieces are boiled for 2-3 hr in drying oil, or steeped in the engine is installed directly on the shock absorbers.



Pic. 32. Installation on plate shock absorbers: 1) machinery frame; 2) studs; 3) plate shock absorber; 4) foundation

The shock absorbers are first fixed to the foundation, and the machinery then mounted on them. The bolts are taken up until the base or frame of the machinery makes complete contact with the upper ends of the shock absorber sleeves (or spacing washers), and they are then taken up a further half turn.

Plate shock absorbers are also used; these consist of steel plates to which a layer of rubber is vulcanized. They are fixed to the foundation and machinery with studs which do not reach the layer of rubber. These shock absorbers are not always sufficiently reliable.

4) Installation of Boilers:

The principle of integrating into combinations greatly reduces the labour and time required for installing boilers. To simplify and speed up the installation of boilers a considerable amount of work which was previously performed on the building berth or while prefabricating the blocks is now performed in the boiler shop (or at the boilermaking works); this includes the adjustment and installation of fittings and fireboxes; the installation of the piping in the boiler; the installation of base plates and brick linings, insulation of the boilers, etc. The boilers are supplied to the ship fully fitted out for installation, i.e., in the form of integrated combinations of equipment. Installation of the main boilers can commence as soon as the basic hull welding is complete and the watertightness tests have been made in the boiler

room region.

The foundations for water tube boilers usually consist of separate welded pedestals; these are mounted beneath the forward and after ends of the lower drums. The drums are secured (in the shop) by the screws to the boiler supports, the lower parts of which are filed and mounted on the base members, the latter welded to the supporting surfaces of the foundations. The supports are bolted on by the bolts. In order that the boiler shall be able to expand when heated, part of the supports has to be made moving.

When water tube boilers are installed, the supporting surfaces of the foundations and the lower surfaces of the boiler supports must be adjusted to one another; this is done by filing the supporting base members. New methods of installing water tube boilers as integrated combinations of equipment have therefore been worked out; with these methods there is no need for machining the supporting surfaces of the boiler foundations: the boiler is installed using an intermediate frame or intermediate parts in the foundation. In this case the boiler foundation pedestals are as it were separated into two parts in depth; the upper parts of these pedestals are connected together by box girders into a separate frame called the "intermediate frame". When the intermediate frame has been assembled and welded, the supporting surfaces of its pedestals are machined. The frame is now transported to the assembly stand, and when it has been checked and fixed in position the boiler is fully assembled on it. The boiler supports are finally fixed to the frame pedestals, and spacing pieces are inserted into the gaps at the moving supports in order to fix their position.

At present the principle of integrating into combinations is applied to auxiliary machinery and the apparatus and devices associated with it, which are mounted on the same foundation frame; the principle is also applied to integrating machinery and devices in common housings. Calculations have shown that, in certain cases, the integration of auxiliary machinery on common foundation frames reduces the weight of the foundations by 20-25%, reduces the amount of labour

required for their fabrication by 75%, and reduces the labour required for their installation on board ship by 60-70%; the amount of piping used is also reduced.

Ex. 19. Answer the questions:

1. What does the term "installation" mean? 2. What is the first stage of installation work? 3. Where is the most of the installation work performed? 4. What does installing of the systems on a ship include? Enlist the consequence of operations. 5. Why is the sailmaking work still used in modern shipbuilding (exclude sailing vessels)? 6. Can you name the stages of equipping a ship electrically? 7. What categories can the auxiliary machinery be subdivided into? 8. What is the difference in mounting the machinery of these categories? 9. Are the shock absorbers completely reliable? 10. Why is a considerable amount of work for the installation of boilers performed in the boiler shop? 11. What do the foundations for boilers usually consist of? 12. What are the new methods of installing water tube boilers? 13. What are the advantages of the principle of integrating into combinations? 14. Is this principle used in shipbuilding only?

Ex. 20. Report on:

a) hull installation work;
b) electrical installations;
c) installation of the auxiliary machinery;
d) installation of boilers;
e) integrated methods of installation.

Ex. 21. Abstract the text in short.

Ex. 22. Speak on the topic "Shipbuilding Technology".

UNIT VII

SHIPBUILDING IN BELARUS

Ex. 1. Read and remember the words:

Carriage, approach, sluice, patronage, access, specificity, scope, negotiation, turnover, forwarder, refinery, molasses, pulp, interaction, abolition, serfage, order, extraction, launch, elaboration, subdivision, item, joinery, pontoon, metalware, overhaul, combustion, spare;

Affect, strive, enhance, benefit, ensure, ransack, manufacture, fulfill;

Navigable, appropriate, acceptable, fair, flexible, internal;

To be underway, to be a stone's throw away

Ex.2. Insert the right word:

Flexible, turnover, underway, approaching, patronage, joinery, acceptable, manufactured, orders, ensures, spares, access, items;

1. The college is under the … of UNESCO and provides the possibility of students exchange. 2. The governmental … makes the largest portion of the plant production. 3. Different … are … by this shop. 4. Such shipment terms are not … for our company! 5. The … to the gate is embarrassed: the … road is blocked by the parked vehicles. 6. The … schedule of shipment is very convenient for construction works. 7. The chief architect … that the project is … . 8. … is produced by the woodworking shop. 9. The … of the port is greater now then ever. 10. The repair must be postponed: we don't have necessary … .

Ex. 3. Change the words of italic type with their synonyms from your active vocabulary

1. *Cooperation* between these two companies will benefit the project. 2. The shipwrecks of this old ship were *robbed* long ago. 3. The *development* of new methods of welding speeded hull construction. 4. There has always been severe competition between *cargo carriers*, who *struggle* for new markets. 5. This shipyard *produces* motor tug boats and

various *metal structures*. 6. A short sea journey will *help* you to restore your health. 7. The shipment expenses will be sure to *increase* unless there is no *cancel* of this toll. 8. This kind of a ship is very *seaworthy* due to its hull contours. 9. The *peculiarity* of the new method is its exceptional cheapness. 10. This company *branch* is in charge for business *talks* with other companies.

Ex. 4. Define in one word:

a) the capital repair;
b) the process of burning;
c) a kind of slavery when peasants work for the feudal;
d) a kind of transport or transportation;
e) to gain profits;
f) to be quite near;
g) a floating bridge;
h) pulling out of smth;
i) water gate;
j) taking place inside smth.

Ex. 5. Translate into Russian:

river navigable routes
bordering states
Water Transport enterprises
sand-gravel mixture
building and repair of vessels
cargo and passenger transportation
wide range of products
elaboration and carrying out
a structural subdivision
meet the needs in
floating and portal cranes
floating means
shipping rules
intergovernmental agreements
great industrial growth
mechanisms and spares
the "river-and-sea" type
the port of registration

the total turnover of the port

the second-largest national group

key position

the key suppliers of materials

the basic raw material

merchant or fishing fleet

a well-developed transportation infrastructure

the authorities of the city

the former naval harbour

Ex. 6. Read and translate the text:

TEXT 7A

BELARUSIAN WATER TRANSPORT

Belarus has a network of river navigable routes with the length of about 2,000 km that connect the country with bordering states. Navigation routes go along the rivers Sozh, Berezina, Dnepr, Pripyat, Neman, West Dvina and the Dnepr-Bug Canal.

Pic. 33. A Tender Motorship

The Water Transport enterprises provide design, building and repair of vessels, cargo transportation (including sand and sand-gravel mixture, extraction and transportation) along the rivers of the Republic of Belarus. Besides, the enterprises of the branch produce wide range of products: launches, boats, waterside pontoons, 5-200 liter paint tanks and flexible concrete mats.

Their main tasks are (1) elaboration and carrying out the program of sea and inland transport development; (2) organization, formation, realization of economic and science and technical policy aimed at creation necessary conditions for effective work of sea and inland water transport enterprises, for satisfaction of national economy and

population demands in cargo and passenger transportation; (3) ensuring optimal interaction between different types of transport and increasing transport export service.

Pic. 34. The Motorship "Olga Somova

The Department of Sea and River Transport of the Ministry of Transport and Communication is a structural subdivision of the Ministry of Transport and Communication.

Enterprises of the river fleet fully meet the needs in transportation of passengers by the water transport of the Republic. Passenger carriage is affected in the towns of Gomel, Brest, Pinsk, Mozyr, Grodno, Mogilev and Loev.

The river fleet of Belarus today includes modern speedy passenger ships of Polessye type (hydrofoil craft) with the capacity of 53 persons, suburban passenger ships, tug fleet, tugged cargo ships and special ships.

Pic. 35. The Motorship "Grodno"

The port facilities are equipped with high-performance floating and portal cranes and mechanized cargo lines designed for fast handling of ships.

Ten river ports of the Republic of Belarus (Mikashevichi, Mogilev, Pinsk, Rechitsa, Vitebsk, Grodno, etc.) are capable of transporting and handling about 22 million tons of cargo. River ports of Gomel, Bobruysk, Brest and Mozyr have railway approach lines and can be used for handling of cargo transported in different directions.

Four waterway enterprises (Gomel, Pinsk, Mozyr, Bobruysk) maintain the required depth of the rivers for navigation of pushed and tugged rolls with the capacity

Pic. 36. Belarusian River Port

up to 2,000 tons. They have the required bottom-deepening and excavation facilities, modern navigation sluices and hydraulic installations as well as navigation equipment.

The Republic of Belarus has 4 shipbuilding and repair plants (Pinsk, Rechitsa, Gomel, Petrikov) the capacity of which allows building new ships with the dead weight up to 3,000 tons of any class as well as repair of ships in operation.

Design of vessels and floating means are carried out at Republican National Unitary Enterprise "Belsudoproekt" (Gomel).

The control over technical conditions of vessels, certification of items used in shipbuilding is fulfilled by the "Belarusian Inspection of River register" Republican Unitary Enterprise (Pinsk).

The control over fulfilling shipping rules in water ways, ensuring safe navigable conditions as well as holding of State Vessel Register are carried out by Belarusian River Navigation Inspection (Gomel).

Transport forwarding companies Republican Unitary Enterprise "Sea Belarusian Steam Navigation and Belarusian Navigable company", "Belarusian Transport forwarding and Chartering Company" working in the system of the Water Transport provide sea cargo transportation.

Although Belarus is an inland state, it strives to create its own sea trade fleet. Our government sees a lot of advantages in creating its national fleet. One of them is to

create jobs for its citizens with maritime professions, another - it will be more convenient for Belarus to transport its production itself.

The year of 2004 saw significant efforts in the field of developing sea shipping in accordance with the instruction of the Belarusian president. The efforts are still underway. The appropriate treaty-legal base was drawn up for the sea shipping activities. In particular, the Inland Water Transport Code and the Commercial Navigation Code were adopted; intergovernmental agreements with Ukraine, Lithuania and Latvia were concluded on the development of inland navigation and transit shipping through ports.

The Belarusian government has stepped up its efforts to create a national merchant fleet. The transport ministry of the Republic of Belarus already has a sea-shipping department. Simultaneously the Belarusian sea lines company is being setting up to carry out sea activities under the government's Program of Inland and Sea Water Transport Development till 2010, which was adopted back in 2003. It is planning that at least two vessels representing our own sea trade fleet of 25 thousand tons displacement will be either leased or bought. They will carry out sea transportations under the Belarusian flag. Now the financial issues are being considered. As for the Navy development, the President stated that Belarus was considering "taking one surface ship and a submarine under Belarusian patronage."

Ex. 7. Agree or disagree with the following statements. Give grounds to your answer:

1. Belarus has a large network of navigable river and sea routes. 2. The Water Transport enterprises not only provide design, building and repair of vessels and cargo transportation but also produce wide range of products. 3. Passenger water carriage is affected in the regional centres of the Republic. 4. There are ten river ports of the Republic of Belarus. 5. The number of waterway enterprises and shipbuilding and repair plants in the Republic is the same. 6. The control over technical conditions of vessels, certification of items used in shipbuilding, fulfilling shipping rules in water ways, and

ensuring safe navigable conditions is fulfilled by the "Belarusian Transport forwarding and Chartering Company". 7. Being an inland state, Belarus looks forward to create its own sea trade fleet. 8. As for the development of the sea fleet, Belarus is considering merchants projects only.

Ex. 8. Answer the following questions:

1. What are the main navigation routes in Belarus? 2. What are the aims and tasks of Water Transport enterprises? 3. Is there a special Ministry for Sea and River Transport in our republic? 4. What does the river fleet of Belarus today include? 5. What is the capacity of Belarusian river ports? 6. What port facilities are provided for Belarusian ports? 7. What facilities and equipment must waterway enterprises be provided? 8. What organizations control the different aspects of water transport operation in Belarus? 9. What advantages are there in creating Belarusian national sea fleet? 10. What efforts for developing Belarusian sea shipping are underway? 11. What is included in the government's Program of Inland and Sea Water Transport Development?

Ex. 9. Translate into English:

1. Наша страна обладает обширной сетью речных судоходных путей, связывающих ее с соседними государствами. 2. Предприятия водного транспорта обеспечивают проектирование, строительство и ремонт речных судов, также как и грузовые перевозки по рекам нашей республики. 3. Предприятия отрасли производят широкий спектр продукции, полностью отвечающей требованиям водного транспорта республики. 4. Эти меры обеспечивают активное взаимодействие различных типов транспорта для эффективной работы предприятий данной отрасли. 5. Плавучие и портовые краны с высокой производительностью работы предназначены для быстрой загрузки и разгрузки кораблей. 6. Подведенные железнодорожные пути могут использоваться для транспортировки товаров из порта в различных направлениях по всей республике. 7. Водные предприятия должны иметь необходимое оборудование для углубления

русла и земляных работ, чтобы поддерживать требуемую глубину на судоходных реках. 8. Производственные мощности этой верфи позволяют строить корабли практически любого класса. 9. Данный проект все еще находится в стадии разработки. 10. Программа предусматривает покупку нескольких торговых судов, водоизмещением до 25 тысяч тонн каждое.

Ex. 10. Define the main topic and idea of the text, split it into the logical parts, and make up the plan of the text.

Ex. 11. Abstract the text.

Ex. 12. Skim the text B:

TEXT 7B

PINSK SHIPYARD

Pic. 37. Pinsk Trademark

In the second half of the XIXth century after the abolition of the serfage the Russian Empire experienced great industrial growth. The development of transport was paid the greatest attention. Pinsk, being a significant trading centre, became a trans-shipment point of the Oginskaya and Dnieper-Bugskaya water systems.

In the 1880s industrial revolution reached the sphere of water transport. The growing industry needed more steamships to meet new requirements. In 1885 the shipbuilding and mechanical yard appeared in Pinsk, with Julia P. O'Brien de Lassie being its owner. But there wasn't stability in incoming orders and the number of workers wasn't constant either. The most favourable was the year of 1902 when the plant put out products on 210,000 roubles with the total staff of 290 workers. But in 1913 the figures were 13,000 and 50 correspondingly.

During WWI the plant property was ransacked and only after the reunion of Belarus in 1939 when the newly established "Western Steamship Company" increased the water transportation in the area, the ship repair plant was made in Pinsk on basis of the former private shops.

Pic. 38. Pinsk Shipyard

During the WWII the enterprise was considerably damaged but was restored already in 1944-45 and soon got a status of a shipbuilding plant. In post-war years the shipyard became a significant enterprise with more than 500 workers. The range of products included cargo and service motorships, tugs, and pushers. In the 1970s-80s Pinsk shipyard launched up to 12 vessels a year. Since 1992 the demand for shipbuilding production has considerably decreased and the plant has to master new spheres of manufacturing.

Today Pinsk shipyard is a modern industrial enterprise working for the needs of the branch. The total staff is about 160 specialists. There are five main and auxiliary sectors with up-to-date technological equipment. The shipyard work is done in the following directions:

1) production and repair of pushing tugs with capacity of 300 and 500 h. p., pontoons and metalware (hull and welding sectors);
2) overhaul of internal combustion engines (diesel sector);
3) metalware of different purpose, mechanisms and spares, plastic and rubber products (mechanical sector);

4) joinery (woodworking sector).

In 2003 after a long break Pinsk shipyard launched the "O"-class tug motorship of a new series.

Ex. 13. Answer the questions:

1. What was the reason that the Russian Empire experienced great industrial growth in the second half of the XIXth century? 2. What date can be considered the birthday of Pinsk shipyard? 3. Why did the shipbuilding and mechanical yard appear in Pinsk? 4. Who was the founder of Pinsk shipyard? 5. Was there stability in work of the shipyard on the early stage? 6. Why was the shipyard reopened only in 1939? 7. Prove that in the Soviet period Pinsk shipyard became a significant enterprise in its branch of the economy. 8. What is Pinsk shipyard nowadays? 9. What are the main directins of the shipyard work now? 10. Can we say that the shipyard has restored its position by the 21st ctntury? Give your reasons.

Ex. 14. Speak on:

a) the history of the creation and early development of the enterprise;
b) Pinsk Shipyard in the post-war period.
c) the main directions of work at present.

Ex. 15. Abstract the text in brief (7-8 sentences).

Ex. 16. Read and translate the text:

TEXT 7C

BELARUSIAN SEA PORT

Though Belarus has no direct access to the sea, the creation of the national fleet is vital and economically efficient for our cargo transportation. At first, it is being

planned to provide the Belarusian fleet with two merchant vessels, either 25 tons of dead-weight tonnage each or 30 tons and 6 tons for the "river-and-sea" type instead. The second variant is more preferable, because (1) it's the most optimum scheme according to the specificity of the existing Belarusian export; (2) we must consider the technical scope of shipment and destination ports of our trade partners (the Brazil, Malaysia, India, etc.), which are not designed for large-capacity vessels. So, ships with dead weight of 30 tons are optimal.

Another question is where the port of these vessels' registration will be. Many countries are ready to render their facilities. Negotiations are carried on with the Ukraine, Poland, Lithuania and Russia.

As Belarus belongs to the Baltic region there are two most acceptable variants to be considered: Klaipeda or Kaliningrad. Both have certain advantages.

As for Klaipeda, one can observe the growing tendency of Belorusian cargo flows. According to the data of 2000 the annual turnover exceeded 3 million tons and in 2003 it was almost 5 million tons, which makes almost 25% of the total turnover of the port. In 2004-2005 Belarus enhanced the volume of cargo, transported via Klaipeda seaport to 6,7 m tons. (To the point: at the same time Russian cargo makes less and less part of the total amount. Russian cargo made almost half of the total turnover of the port in 1999 but in 2002 the volume of Russian cargo decreased by 10%.)

Representative offices of some Belarusian forwarders are working successfully in Klaipeda port as well as some Lithuanian companies are working in Belarus. The main export cargoes of the republic are oil products from Novolipetsk and Mozir refineries, which make almost half of the total quantity of export, mineral fertilizers from Soligorsk and steel products from metallurgic factory in Zlobin. Molasses and food products make the greater part of overseas import.

Though the share of Belarusian cargo permanently grows, their quantities are not big even if the most modern container and multi-modal transportation technologies are used. Lithuania is interested in attracting more road carriers to Lithuanian ferry lines. There are not so many timber products and ready-made products in the port.

In spite of the fact that Belarus is the member of CIS and has declared about the union with Russia, the Lithuanian side plans and forms its relationships with Belarus and Russia separately. The Klaipeda variant will surely help our republic to form modern marketing system and make better conditions for closer cooperation of businessmen and transport people of both our countries and consequently the whole Baltic region. Besides, geographically Klaipeda Seaport is the nearest to Belarus - only 415 kilometers from the border. And the fact that this port is a non-freezing one is of no less importance.

So, maybe Klaipeda will become the seaport of two states – Lithuania and Belarus.

Pic. 39. Probable sea-ports for Belarus

The other variant to be thought more preferable by many is Kaliningrad. It has traditionally been a city that is very close to Belarus. It is not just a neighbour that is only a stone's throw away, as the saying goes. More than 100,000 Belarusians live there. They are the second-largest national group after the Russians. The Belarusians are actively involved in the region's economic and social life and hold many key positions. The economic links of whole economic sectors of Belarus and the Kaliningrad Region have remained intact since Soviet times. Belarus supplies 75-80 percent of the timber for the paper and pulp plants of the Kaliningrad Region. In return, we get pulp, the basic raw material for our paper industry. We have also been and remain the key suppliers of

materials for walls (bricks, cement, concrete) for construction in the region. Furthermore, Belarusian contractors do a fair amount of the construction.

There is interaction between Belarus and the region also due to the magnetism of the Baltic Sea. In Belarus there have always been many people who wanted to link their life to that sea by serving in the merchant or fishing fleet. Moreover, it is vital to us that the Kaliningrad Region has a well-developed transportation infrastructure and access to the Baltic Sea so that we can quickly and effectively export our goods. If it wasn't necessary to get Polish and Lithuanian visas when using ground transport, then we would have no problems at all with citizens traveling within the Union state.

Both Belarus and Russia benefit from our presence in Kaliningrad, that's why this presence will grow. The authorities of the city has already suggested to Belarus to build its own port in the town of Zelenogradsk, Kaliningrad region, on basis of the former naval harbour.

In conclusion it should be noted that there can be the third variant being supported by the Ministry for Transport of Belarus. It is the cooperation project (so-called "2K-project") of both Klaipeda and Kaliningrad ports.

Ex. 17. Answer the questions:

1. What are the two variants planned to provide Belarusian merchant fleet with sea-going vessels? 2. What is the second important question of this plan and what may the probable solution be here? 3. What are the most acceptable variants of future Belarusian port? 4. What are the main export cargoes of the republic through Klaipeda port? 5. Enlist the possible advantages of the "Klaipeda variant". 6. Prove that there exists close interaction between Belarus and Kaliningrad region. 7. Can we say that economic links between Belarus and Kaliningrad are histerically strong? Give your reasons. 8. Where can be the most probable position of the Belarusian sea-port? 9. Are there other variants of Belarusian sea-port considered? 10. Explain the origin of the term "2K-project".

Ex. 18. Explain why:

a) the creation of the national fleet is vital and economically efficient for our cargo transportation;
b) the second variant of sea-going vessels' provision is more preferable;
c) the cooperation with Belarus can become more preferable for Klaipeda than even with Russia;
d) the Belarusians are actively involved in the Kaliningrad region's economic and social life and hold many key positions;
e) both Belarus and Russia will benefit from our presence in Kaliningrad;
f) the Kaliningrad authorities has suggested to Belarus to build its future port in the town of Zelenograd, Kaliningrad region.

Ex. 19. Develop the idea:

1) Though Belarus has no direct access to the sea, it is being planned to provide the Belarusian fleet with two merchant sea-going vessels;
2) Klaipeda may become the seaport of two states – Lithuania and Belarus;
3) The Kaliningrad variant is thought by many to be more preferable.

Ex. 20. Make up a short summary of the text.

Ex. 21. Speak on the topic "Shipbuilding in Belarus"

UNIT VIII

FUTURE PERSPECTIVES OF SHIP-BUILDING

Ex. 1. Read and remember the words:

rudder	containerize	interdependent
maintenance	wear from	prospective
tossing	define	excessive
preconditions	reduce	windage height

Ex.2. Insert the right word:

(Technical training, engine room, pilot's cabin, bridge, maintenance, computer)

1. Neither a staff of engineers no a crew of the ship will do ship … ,but the qualified
   workers in port.
2. The plane engines can be run from the … .
3. There is no necessity for a crew or a staff of engineers of future ships to stand watch in the … .
4. The engine of a future ship can be managed from the … .
5. In the ships of future all data, control and further operations will be determined by
   a … .
6. The staff of a future ship need more qualified … .

Ex. 3. Change the words of italic type with their synonyms from your active vocabulary:

1. Essential reduction of volumes of the hull *in case of emergency* will improve storm maneuvering.
2. The plane engines will be *put into action* from the pilot's cabin.

3. *Placing* of the basic volumes in a stern part of the hull that takes into consideration
   the storming navigation is one of preconditions for safe storming.
4. *Changing* of the center of gravity to a bow will provide *horizontal tail-planning*
   of tossing at the moment on excitement.
5. *Substantial cutting down* of crew will be the result of efficient development of a future ship.
6. The prospective projects of future ships contribute to the *safety* of fastness in conditions of real ocean navigation.

Ex. 4. Define in one word:

- Load or cargo packed in different volumes (special tanks, cans etc.);
- special arrangements/structures put up on the top deck above the deck- level;
- some things (lows, rules) , which are dependent on each other;
- going up and down of a ship on the waves at the moment on excitement;
- lows and rules of "sea traffic";
- capacity of a ship to preserve fastness in any conditions of real ocean navigation;
- capacity of a ship to swing in any proper direction, to change speed if needed, to balance perfectly even in storm conditions.

Ex. 5. Translate into Russian:

1. Electronic equipment will determine a ship's course and, by sending information to machinery regulate the rudder, steer the vessel.

2. There are six interdependent rules, received from historical analysis of properties of ship architecture.
3. Aluminium is corrosion- resistant and can prevent wear from the chemicals in seawater.
4. Displacement of the center of gravity to a bow advancing the dynamic center of lateral resistance will provide stabilization and assure fastness in conditions of storm roughness.
5. Exclusion of boards flares, wide and continuous top deck as also inclination forward of surface part of the stem will remove a problem of excessive tossing and impacts of waves during storm.
6. Essential reduction of the area of inertia of a waterline surface, volumes of the hull and windage height of superstructures will contribute to preservation of fastness in conditions of real ocean navigation.

Ex. 6. Read and translate the text:

TEXT 8A

SHIPS OF THE FUTURE

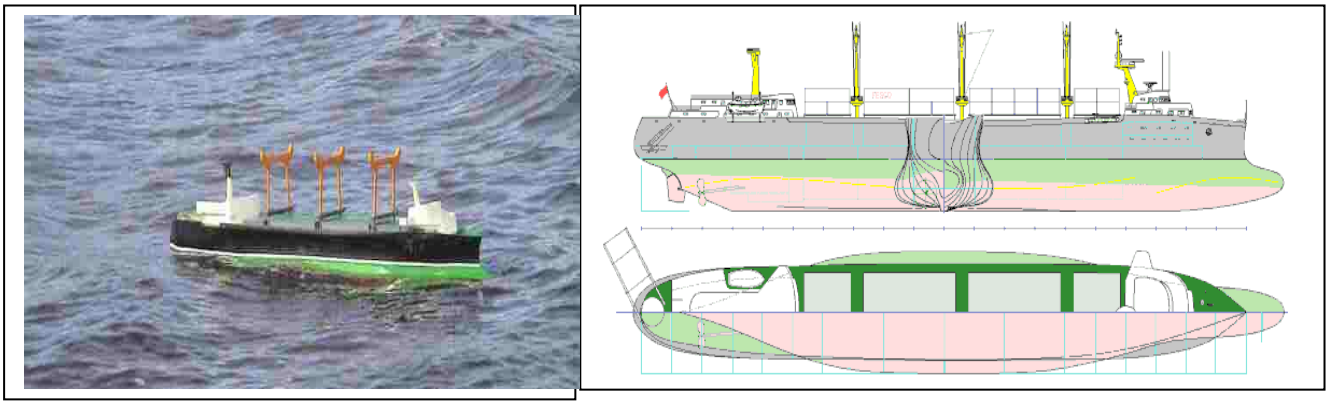
Future ships will be even more efficient than those of today and so will cost less to operate. More and more ships will carry containerized cargo, and all ships will be larger. Ships will become increasingly automated. A staff of engineers will no longer need to stand watch in the engine room. Instead, ship engines will be operated from the bridge, just as plane engines are run from the pilot's cabin. Electronic equipment will navigate tomorrow's ships automatically. A computer will determine a ship's course and, by sending the information to machinery that regulates the rudder, steer the vessel.

As a result of these developments, ship officers will receive increased technical training. Crews will become smaller. Ship maintenance will no longer be done at sea by the crew, but in port by specialized workers. To avoid such maintenance work as

painting, the bridge, cabins, and other structures on the main deck will be built of aluminum and other materials that do not rust and that resist wear from the chemicals in seawater. The officers and crew of a ship work as a team to see that the passengers, the cargo, and the ship itself arrives at their destination safely and on time.

Speaking on shipbuilding principles of the coming century, in the prospective project of a future ship the following six interdependent rules, received from the historical analysis of properties of ship architecture, should be included:

1. Displacement of the center of gravity to a bow, advancing the dynamic center of lateral resistance. It will provide stabilization of tossing at a movement on excitement and create the preconditions for safe storming;
2. Essential reduction of the area, and also cross and longitudinal moments of inertia of a waterline surface, and sharpening of stem and stern posts it in extremities. (For reduction the influence of moderate excitement and preservation of fastness in conditions of real ocean navigation);
3. Exclusion of boards flares, wide and continuous top deck (and also inclination forward of surface part of the stem). During storm navigation it will remove a problem of excessive tossing and impacts of waves both on the hull, and on a deck, and also will create conditions for active management of a course of a vessel;
4. Essential reduction of volumes of the hull in extremities, that will improve storm maneuvering;
5. Allocation of the basic surface volumes in a stern part of the hull that takes into account properties of real storm roughness and does not prevent preservation of a course and maneuvering;
6. Essential reduction of windage height of superstructures, remembering that the beauty of the ship is defined by absence of unnecessary things on board.



Pic. 40. In the project of a universal vessel is shown, that the realization of the form of the hull satisfying to all set forth above requirements to seaworthiness, is possible even for the most complex universal vessel.

Ex.7. Answer the questions:

1. Does the prospective project of a future ship require any changes of technical facilities and personel?
2. What materials can be more preferable to build the bridge, cabins and other structures on the main deck?
3. What arrangements must be done for reduction the influence of moderate excitement and preservation of fastness in conditions of real ocean navigation?
4. What can create conditions for active management of a course of a vessel?
5. What is the beauty of a ship defined by?

Ex. 8. Agree or disagree with the following statements. Give grounds to your answer:

1. Substantial minimization of the area, cross and longitudinal moments of inertia of a waterline surface, sharpening of stem and stern posts reduce the impacts of waves in extremities.
2. Essential reduction windage height of superstructures defines the beauty of a ship.
3. Exclusion of boards flares, wide and continuous top deck and inclination forward of surface part of the stem will solve a problem of excessive tossing and impacts of waves on the hull and on the deck.
4. Placing on the basic surface volumes in a stern part of the hull envisages (предусматривает) the real storm roughness and good maneuvering during storm navigation.
5. One of the several rules received from the historical analysis of properties of ship architecture is essential reduction of the hull.

Ex. 9. Translate into English:

1. Корабли будущего будут более эффективны, чем в настоящее время и намного более автоматизированы.
2. Технические работы на корабле будут производиться не командой в море, а специалистами на берегу.
3. Значительное сокращение высоты надпалубных сооружений также поможет улучшить маневрирование судна во время шторма.
4. Исключение бортовых выступов, широкой и длинной верхней палубы, как и наклон передней части носа корабля позволит решить некоторые проблемы навигации в штормовой ситуации.
5. Перенос центра тяжести на нос корабля и перемещение центра динамики горизонтального сопротивления обеспечит стабилизацию движения корабля при волнении на море.

Ex. 10. Define the main topic and idea of the text, split it into the logical parts, and make up the plan of the text.

Ex. 11. Abstract the text.

Ex. 12. Read and translate the 2nd part of the text:

TEXT 8B

THE NAVY IN THE 21ST CENTURY

Sea warfare will never be the same again. The titanic mid-ocean battles that were the scenario of the Cold War will never be enacted. Instead, future naval battles will be fought along coastlines against developing countries or small regional powers. The navy of the future will be optimized for shallow water warfare, and in this respect minehunting vessels will come into their own, for mines will present a serious risk to inshore operations. There are mine-countermeasures vessels already in service, which are constructed from glass-reinforced plastic to give maximum protection.

'Stealthy' warships, capable of approaching a hostile coastline and operating undetected within sight of it, are already in an advanced stage of development. In 1997, British shipbuilders unveiled a 'Stealth' ship called *Sea Wraith II*, which employs various deception devices. For example, it has a mast fitted with various dihedral and trihedral shapes, which strongly reflect radar signals, masking the ship's true radar signature.

Pic. 41. A futuristic 'Stealth' frigate "The Sea Wraith II"

Sea Wraith is also camouflaged in the thermal part of the spectrum, to defend against heat-seeking missiles. A ship's thermal signature comes mainly from the engine

exhaust, which heats up the funnels. To minimize this effect, *Sea Wraith* passes its exhaust fumes through sea water before expelling them, so that all that emerges from the funnels are cool gases.

Measures such as this, however, are not enough to confuse the latest generation of anti-ship missiles, which home in on their target using thermal video images. The only way to protect the ship is to hide it entirely. *Sea Wraith* has a cloaking device that hides the whole ship from sensors in the visible and infrared regions. The vessel will be fitted with thousands of tiny nozzles that spray atomized water into the air, enveloping the ship in a giant cloud of fine water droplets. This absorb both short- and long-wavelength infrared as well as visible light, but allows the ship's radar to function normally.

Another project that might one day form a vital component of the Navy is the Stealth Trimaran Aircraft Carrier (STAC), which is being investigated as an option to replace the existing aircraft carriers. STAC will be faster, longer, wider, more stable and far less vulnerable to attack. Incorporating the latest 'Stealth' technology, it will have a radar signature similar to that of a fishing trawler. Displacing some 40,000 t, it will carry 55 aircrafts and have a maximum speed of 40 knots. Her hull configuration, almost 1000 ft (300 m) long with a flight deck of 328 ft (100 m) wide, permits up to 30 aircraft to be prepared for launch at one time. The two out-rigger hulls will protect the central hull from torpedoes and missiles, and will keep the carrier afloat in the event of severe damage.

Such advanced warships, like STAC for example, will cost about £3 billion per unit, which raises the question of whether even a developed nation can afford it. Whether these developments can help to make our dangerously unstable world safer is another matter.

Ex. 13. Answer the questions:

1. Whether the scenario of present and future sea warfare are the titanic mid-ocean battles? Is the American invasion of Iraq one of the examples of future naval battles?

2. What kinds of navy come into the sight in this respect?

3. Are there any ships to counteract such vessels?

4. The warships of what capacity are ready in an advanced stage of development?

5. What deception devices are used on a "Stealth" ship?

6. Has *Sea Wraith II* any resources to defend against heat- seeking missiles?

7. Does the cloaking device help to hide the ship entirely?

8. What does the latest "Stealth technology" consist of?

9. Will two out- rigger hulls protect the central hull of new STAC and do it less vulnerable to attack?

10. Could such new investigation in the navy safe our unstable world?

Ex. 14. Explain why:

1.The titanic mid- ocean battles (that were the scenario of the Cold War) will never be enacted.

2. The navy of the future will be optimized for shallow water warfare?

3. Glass- reinforced plastic was chosen for construction of mine-countermeasures vessels.

4. A "Stealth" ship called *Sea Wraith II* can strongly reflect radar signals.

5. The engine exhaust of *Sea Wraith* emerges from the funnels are cool gases.

6. Such measures are not enough to confuse the latest generation of anti- ship missiles.

7. *Sea Wraith II* is invisible for both long- and short- wavelength infrared.

8. The Stealth Trimaran Aircraft Carrier is identified by a hostile radar?

9. The central hull of STAC is more inaccessible for torpedoes and missiles.

10. Even a developed country can hardly afford a warship like STAC.

Ex. 15. Develop the idea:

1) Sea warfare will never be the same again. Great battles of the XIX- th century, early XX- th century and even the Cold War scenario's

titanic mid- ocean battles are in the past.

Politics is changing, and politicians consider another tactics and strategy.

2) Navy of future disposes the vessels of new generation, made of new materials, employing various deception devices.
3) The latest generation of anti- ship heat- seeking missiles home in their target using thermal video images. Some measures are developed to protect a ship from torpedoes and missiles.
4) New "Stealth" technologies can even deceive physical lows; confuse the detection systems. Not only a single ship but the whole aircraft carrier can vanish.
5) Military technologies (like "Stealthy" technologies) are fantastic, tomorrow technologies. Great amount of money are spent for war aims. The cost of every warship of new generation is equal to the annual budget of a developing country.

Ex. 16. Make up a short summary of the text.

Ex. 17. Read and translate the text. Speak on the ways of ship future automation.:

TEXT 8C

INTELLIGENT SYSTEMS OF SHIP AUTOMATION

Shipbuilding has been always based on the new technologies. During the past years the development of the ships has been based on the implementation of the new solutions of the traditional shipbuilding subjects - hydromechanics, strength of materials and energy. A bit later the main priority was given to the application of physical fields (acoustic, electromagnetic, radiolocation, heat, radiation, etc.). Considerable results have been reached in all the above sectors.

The development of the shipbuilding in the past 20 years has been characterized by the degree of using electronic systems. During a historically short period the shipbuilders have passed the way from automated ships' rudders and some automated weapons on warships to complicated systems of automatic control of the ships' power stations, equipment and movement. A fully integrated system of control is being developed. The modern automated ship controls have high degree of reliability, high survival rate, big volume and high rate of signal processing.

The new tasks and principles allow formulating the new general requirements to the perspective ships. The most important of them are as follows:

- multi role nature of a ship in general;
- universal nature of electronic systems;
- high survival rate;
- maximum compatibility with foreign ships and possibility of cooperating;
- maximum level of ecological safety;
- improved living conditions;
- highly ergonomic machinery.

The multi role nature of large ships as well as the complicated nature of their operations excludes the suggestion to make the ships fully automatic even in the remote future. Therefore the development of ship automation should be based on further integrating separate functional systems, extending their intellectual level and the number of the instruments that can be used. The most perspective direction of automating the ship and introducing robots is ensuring the viability during various damages, as well as servicing potentially dangerous units and systems.

Modern shipbuilders have practically completed changing over to the use of the most modern electronic components and hardware. This enables to assess prospects and philosophies for configuring complex control systems for engineering systems (CCS ES) of the XXI century. The new-generation systems, which should become intellectual, will be designed based on the following principles:

- integration of CCS ES subsystems based on a common (uniform) set of components;
- increase of the share of warning or prediction control actions in addition to the existing damage-response control actions;
- development of computer-aided safety systems;
- increase of the automation level;
- introduction of distributed network architecture based on a common telecommunication net with enhanced reliability and survivability features;
- transition from the concept of operator and technical control station to the philosophy of management-and-engineering systems;
- connection to an integrated information space of the ship;
- establishment of CALS (Computer-Aided Acquisition and Logistics Support) technologies for the development of our products and for supervising them through all stages of their service lives.

The example of the above-described approach is the development of integrated ride control systems, in which a crucial component is the integrated bridge control system (IBC).

It is necessary to clarify the notion of IBC because it is often understood as just a variety of systems assembled in a single control panel. The future IBC will truly integrate different ship controls into a unified inter-related system.

The IBC consists of computer-aided modular workstations for the skipper, the watch officer and the steersman. These modules serve for:

- data acquisition, analysis and display;
- ship navigation safety;
- ship heading and speed controls, remote monitoring for the main power plant, the electric generating plant, etc.

In the automatic mode, the IBC caters for ship steering and navigation safety, controls the set course and speed, monitors principal parameters of the main power plant, controls hull systems. Additionally, the IBC directs crew actions underway, in

harbours and unsheltered roadsteads, monitors environment conditions in principal ship spaces.

The main idea implemented in the IBC is integrating the indication of data arriving from terminals, hull system and hardware controls into a single unified system.

So, intelligent systems of ship automation will be certain to ensure a new quality level of ship equipment control systems; will enhance efficiency, reliability, survivability and safety of onboard engineering systems and of naval and commercial ships in general.

Ex. 18. Summarize the main points of the unit in a form of a short report. Add some new information if you can.

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SUPPLEMENTARY TEXTS

VESSEL FAMILIARIZATION

While Staffing a Liner

Any Line Company ensures that no personnel will be assigned to perform any duties on a seagoing vessel unless they have received sufficient information and instruction in a number of subjects affecting personal safety.

The objective of Vessel Familiarization Training is to ensure all seafarers, including those who are working on a ship for the first time, know basic personal safety information that may save their lives and the lives of others in the event of an emergency.

Minimum Requirements for the Vessel Personnel

Before being assigned to shipboard duties, all persons employed or engaged on a seagoing ship other than passengers, shall receive approved familiarization training in personal survival techniques or receive sufficient information and instruction to be able to:

1. Communicate with other persons on board on elementary safety matters and understand safety information symbols, signs and alarm signals;
2. Know what to do if: a person falls overboard, fire or smoke is detected, or the general alarm is sounded;
3. Identify muster and embarkation stations and emergency escape routes;
4. Locate and put on life jackets;
5. Raise the alarm and have basic knowledge of the use of portable fire extinguishers;
6. Take immediate action upon encountering an accident or other medical emergency before seeking further medical assistance on board;
7. Close and open the watertight, fire and weathertight doors fitted in the particular ship other than those for hull openings.

Signs on the ship are divided by color code:

- A sign that has a green background is related to lifesaving.
- A sign with a red background is related to fire equipment and fire fighting.

- A sign with a blue background indicates caution.
- A sign with a yellow background indicates warning.

An emergency escape route is a path that leads from a cabin or a work place to the muster stations or the open decks. Emergency escape routes are marked with symbols and arrows showing in which direction to go. Emergency lighting escape route indicators are installed on board the ship. In the event of an emergency, a low level guidance system will be operated automatically. This consists of a lighted strip and it will lead to an exit. If there is smoke in the corridor keep close to the floor and crawl if necessary to avoid breathing the smoke and be able to see more clearly.

Alarm signals and codes are given on board a ship to indicate emergencies. These signals are sounded on the ship's whistle and Public Address (PA) system. Alarm signals are given as a combination of short and long "blasts" and/or bells.

Systems Of Signals

Codes: Coded announcements on the PA system;

Blast: A blast is a signal given on the ship's whistle;

Bell: A bell is a signal given on the ship's internal alarm system;

Long Blast: The duration of sound of a long blast is greater than six seconds. It is usually indicated in instructions as a "dash" which looks like: "-";

Short Blast: The duration of sound of a short blast is less than two seconds. It is usually indicated in instructions as a "dot" which looks like: ".";

General Emergency Alarm Signal: Seven or more short blasts and one long blast on the ship's whistle (". . . . . –") supplemented by the same signal over the loudspeakers. (". . . . . –");

Abandon Ship Call: The order of abandon ship will only be given by the Master over the PA system;

Man Overboard Signal and Call: One long blast on the ship's whistle ("-") and code "Bravo Bravo" given over the ship's PA system;

Fire Onboard Call: Code "Alpha Team to ..." given over the ship's PA system;

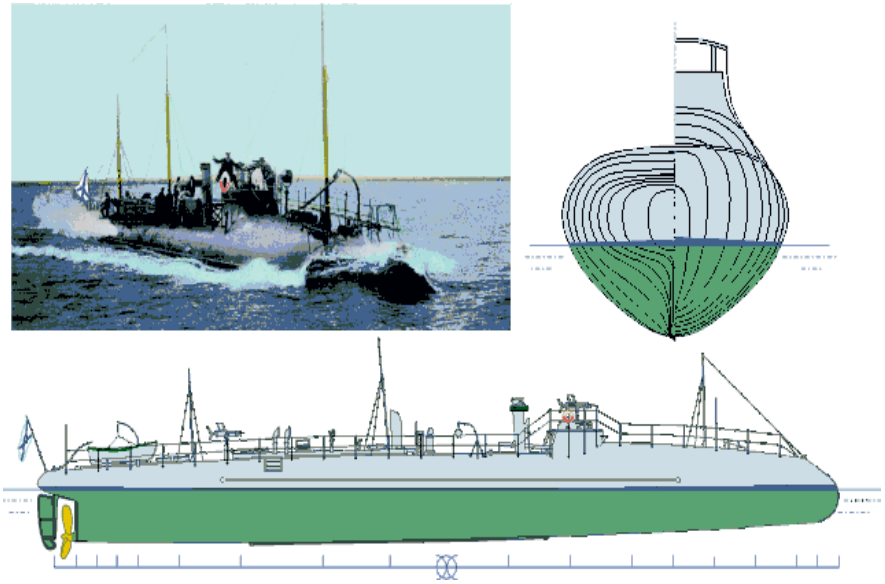
Damage/Pollution Call: Code "DACO team to ..." given over the ship's PA system;

Bright Star Call (Medical Emergency): Code “Bright Star Operation to ...” given over the ship’s PA system.

NAVY SHIPS OF THE EARLY XXTH CENTURY

Cruisers and destroyers constructed at the end of the XIXth and beginning the XXth centuries had ideal architecture of the hull by all the criteria.

The destroyer used a storm course in a mode "cut through" of waves. It is known, that in 1887 there were the sea keeping experiment for destroyer on 6 ball roughness, where she went towards to a wave and burying (going too far) on running cabin, showed 15.5 knots, and 17 knots at a course on a wave. According to the drawing it is clear that the bow had not a property to climb on a wave, on the contrary, it provided pressing of the hull to a surface of a wave on the ship motion that was necessary for stabilization of work of rowing screws in conditions of large roughness.



Pic. 42. Destroyer of type “Izmail”

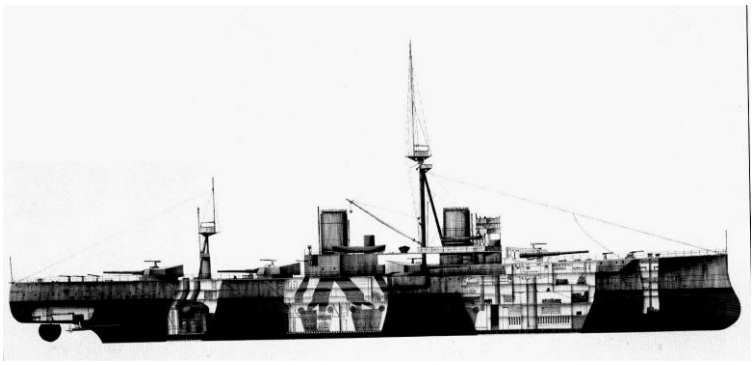
A cruiser had international form of hull, and her sea keeping quality is very similar to above-mentioned destroyer. The essence was non-resistance of storm phenomena. The inside tilt of boards and absence of the large continuous areas on the top deck was characteristic for the ship. There was obvious technological complexity of the hull, in contours of which there was no direct line.

Her modification were the battlecruiser, a vessel nearly equal in armament to other battleships but very much swifter, a ship that could cruise ahead and scout for the main battle fleet, and be capable of overwhelming any conventional cruiser. Actually,

the concept arouse from a simple fact that existing cruisers had evolved into ships so large and expensive that they soon reached the end of their development.

Linear ships of that time had non-smaller seaworthiness. They had low and pointed bows and quarterdecks, which basic surface volumes were going in an average part of the hull. It provided a steady movement on roughness in conditions increased sweeps of extremities.

In 1904 in Great Britain there was appointed a committee to study a concept of a warship, which would carry a battery of 305 mm guns but would be much faster than any other type of a battleship, having a speed of 45 km/h (25 kt) or thereabouts. A prototype of this "super-battleship" was laid down by Portsmouth Dockyard in October 1905, and she was constructed in great secrecy and in record time, a year and a day later. The name given to the formidable new ship was the *Dreadnought*. The prototype was a success and the construction of this revolutionary type of battleships proceeded rapidly, at the rate of three or four per year. The last dreadnoughts were launched in 1913. Their appearance changed the face of naval warfare and began an arms race with Germany in the years leading up to World War I.

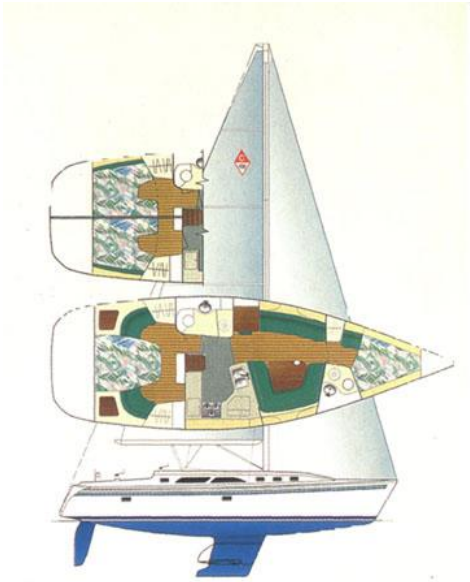


Pic. 43: HMS "Dreadnought"

There were no special requirements of propulsive quality of ship at stormy ocean to transport steam vessels because of cumbrousity and low power of the main engine. The vessel had pointed vertical stem and rounded hanging above water to an aft. In case of storm weather the vessel should take a course by a bow to a wave and to be kept on it with the help of engines before improvement of weather.

THREE FROM CATALINA

Two new designs and an update of an older one will be represented by this American yard, which is celebrating its 25th anniversary this year. All three are in the company's tradition of spacious, practical cruising yachts, which offer a lot of boat for the money.



Catalina 400

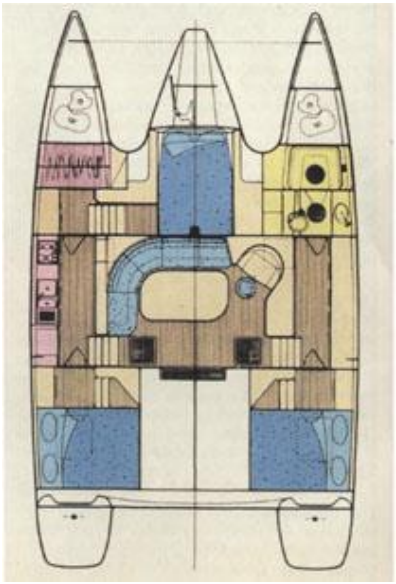
The 12.3 m *Catalina 400* has a massive interior with the galley being the central feature. The saloon has a dinette with seating for seven and the self-contained forecabin is also generously proportioned. Astern she can be fitted with a huge master cabin or two, still sizeable, cabins for crew. On deck she has a powerful masthead rig and large cockpit, with twin steering position and a large table. She is available in different keeled (deep fin or shallow wing) versions.

The *Catalina 380* (11.75 m) is a very similar package on a slightly smaller scale.

The *Catalina 34 MkII* is based on the well-proven hull but with an improved interior.

A "BABY" IN THE CATS' FAMILY

The *Venezia 42* is a new "baby", the smallest one, in a fleet of cruising cats ranging up to 20 m. A big looking, even by catamaran standards, craft (12.6 m), she is only 6.6 m wide and weighs about 6.5 t. In common with her larger sisters, she has a moulded pod extending forward from the bridgedeck. It looks attractive in the drawings and in reality is probably most suitable for children.



The interior is clean, light and functional with a minimum of wood trim to keep building simple, weight low and maintenance easy. It has two double cabins and a heads compartment in each hull, an efficient galley, a bit awkward but large dining saloon, and rather small navigation area on the bridgedeck.

In other words, being efficient but not overlarge, the interior is the sort, which encourages the outdoor life.

ADDISON'S SHIPYARDS

During the 19th century, Maine coast villages revolved around the construction of wooden sailing vessels. The vessels in Addison helped transport agricultural products to distant markets. Addison's shipyards built mostly schooners but barks and brigs were also built there.

British ships along the Maine coast brought Maine ship building to a halt during the Revolution. At the beginning of the 19th century, ship building had recovered.
Leander Knowles was the most productive shipbuilder in Addison. He built 50 vessels in his lifetime and died in 1888.

Shipyards were places for people with little or no skills to be employed. In 1850, 25 men from Addison were filed as ship carpenters. Most work was done by ax, adz, saw, auger, and hand. You could even make a living by sealing cracks between planks.

The ship's blacksmith made a great deal of items that held the ships together. There were spikes, bolts, mast caps, and chain links used on the ships.

One of Addison's independent sail lofts was owned by Oscar Brown.

Francis Aymer made "Pump and Block." He supplied blocks for many shipyards in coastal towns. The 1850's census indicated that Aymer used lignumvita,

ashplanks, and iron sogs to produce 2000 block shells, 16 vessel wheels, 12 vessel pumps, 1400 vessel blocks in a single year.

Shipbuilding was definitely a big industry in Maine during the mid–19th century. By 1850 Maine had made more ships than any other state.

PERSPECTIVE SHIPS. GENERAL REQUIREMENTS AND WAYS OF IMPLEMENTING

The new tasks of the navy and the new principles on which it should be built allow formulating the new general requirements to the perspective ships. The most important of them are as follows:

multi role nature of a ship in general;

universal nature of the weapons and electronic systems;

low degree of visibility of physical fields;

high survival rate when hit by various munitions;

maximum compatibility with the ships of foreign navies and possibility of cooperating;

maximum level of ecological safety;

improved living conditions;

highly ergonomic machinery.

The multi role nature of a ship is required because the number of the ships in the future fleets will be limited but the tasks they face will remain different. This criteria can be met first of all by making the arms systems universal, for example, using the vertical launch systems for the missiles of different types against surface, submarine (including small sized), air and ground targets. It includes the high precision missiles hitting the ground targets with minimal detriment to the nearby objects and population.

The radio electronic systems of detecting and targeting must be made maximum universal, which will ensure better fire control and lower costs.

Stealth architecture combined with the highly efficient radio electronic counter measures is the foundation of the surface ships' protection system. The protection of the

subs is determined by the proper methods of reducing the acoustic and other fields of the subs.

The requirements to the ships' survival rate must ensure survival when the ship is once hit by any kind of munitions. The ship's design and construction, especially of its explosion-vulnerable and vital parts, fire control measures are the means of meeting the requirements of the survival rate. It is not excluded to consider the return to the method of armoring the ships on a new technological level.

The ecological requirements are ensured by the growing number of measures aimed at avoiding the pollution of the air and water during maintaining the ship at peace and repairing its different navigational and combat damages.

The living conditions on board the warships must be improved, especially in the navies which switch from the enlisted personnel to the contracted one.

In order to maximum avoid the human mistakes it is necessary to improve the ergonomics of the machinery and equipment. The volume and the quality of personnel training is improved using the electronic simulators.

Special attention should be paid to forming the requirements to ships, which may become part of the international coalition formed for peace keeping and anti terrorist operations.

The high probability of using the battle ships together with the foreign navies makes it necessary to ensure maximum compatibility in speed control, endurance, communication means, systems of loading / discharge, landing / take off, rescue means etc.

THE MAIN DIRECTIONS OF THE DEVELOPMENT AND THE FEATURES OF THE PERSPECTIVE SHIPS

The new purpose and the tasks of the navy, the general trend towards reducing the fleets and the fleets' infrastructure, mentioned above, as well as the reduced budgetary defense allocations made it necessary to develop new approach to the features of the future ships. We mean the ships which will come in 2010-2015, because due to

the complicated nature of a ship it takes at least 10 - 15 years between the ship's concept and manufacturing.

The development of the strategic submarine missile carriers will continue within the frameworks of the international agreements, where an important role is given to the just ratified American-Russian agreement on limiting the strategic attack potentials, signed by the Presidents in 2002, under which each party determines itself the composition and the structure of its strategic attack arms based on the limited total number of warheads. Earlier agreements on the strategic attack arms restricted the number of the newly developed complexes, their carriers (including missile carriers), the number of the missiles and the blocks on the missiles. Keeping in mind the general tendency of reducing nuclear arms and developing the high precision cruise missiles with non-nuclear charges, in 20-25 years the nature of such submarines may be considerably changed.

Multi role nuclear submarines will develop becoming multi functional and universal. The main criteria in the development will remain reducing the noise level, improving the hydro acoustic weapons and reducing the level of other fields.

Utilizing the high precision cruise missiles with non-nuclear charges on such submarines will attribute the role of the strategic deterrence weapon to this class of subs.

Only five nations have multi role nuclear subs, whereas 43 nations have diesel-electric subs. Their total number is 380. The development of this class of subs, especially "coastal" subs of limited (as a rule 1000 tons) deadweight will go in the following directions:

increasing the power and the suddenness of the strike due to the increased number of combat ready weapons;

increasing the submarine speed aimed at intercepting the surface warships and transports within the vicinity of own coastline to ensure preventive strikes;

increasing the submarine endurance;

reducing the physical fields to the minimal level, first of all the fields of the electro magnetic group, aimed at minimal visibility when on patrol;

complexly automating the control systems of the ships and reducing crews.

Anaerobic power stations, especially single units, will make a great impact to the development of this class of subs.

The tasks of the navy provide for a certain composition of the general purpose ships, which includes an aircraft carrier, multi role ocean ship to protect the aircraft carrier and conduct own missions (destroyer), universal ship of the sea zone (frigate), short range ship (corvette) and mine sweeper.

Aircraft carrier can ensure air superiority for the long term campaigns as well as the organization, control and sustainability of different armed groups in a conflict area. Such ships are unique and expensive; therefore they will be made by a very limited number of nations. This is the most conservative type of a ship, and it will develop in the traditional direction.

The multi role ocean ship, having the characteristics of a torpedo carrier, anti sub ship and missile-artillery ship (destroyer), will have the displacement of up to 10 000 tons, the speed of 28-30 knots and the endurance of up to 10 000 miles at 16-17 knots speed. The type of the main power station is gas turbine with fully electricity based movement.

The destroyer will have a complex of missiles with universal vertical launching systems to use high precision missiles against ground targets, missiles against surface and submarine targets, air defense missiles of far, medium and small range targets as well as a universal artillery unit with high precision controlled shells against ground and surface targets. The ship will have one or two helicopters.

The radio electronic means of a destroyer will consist of the universal unit of detecting and targeting, a complex of radio electronic counter measures, a hydro acoustic complex for detecting subs, anchor and bottom mines, anti diversion means.

The universal ship of the sea zone (frigate) will have the displacement of about 5000 tons. Even now there are prerequisites to provide absolutely the same complex of

weapons to the destroyer and the frigate with the only difference in the number of spare charges. At the same time such ship, having smaller displacement than the destroyer will be much cheaper. For most nations frigates will be the main battle ship.

The last ship in the surface list is corvette with the displacement of up to 2000 tons. It is supposed to conduct short range and coastal operations as well as the functions of the border guard.

A large role is given to the anti mine ship, which will have self propelled complex for detecting and destroying the mines ahead of the ship.

Military shipbuilding has been always based on the new technologies. During the past years the development of the ships has been based on the implementation of the new solutions of the traditional shipbuilding subjects - hydromechanics, strength of materials, (electric) energy. A bit later the main priority was given to the reduction of physical fields (acoustic, electromagnetic, radiolocation, heat, radiation etc.). Considerable results have been reached in all the above sectors.

The development of the shipbuilding in the past 20 years has been characterized by the degree of using electronic systems. During a historically short period the shipbuilders have passed the way from automated ships' rudders and some automated weapons to complicated automatic systems of combat control (ASBU), automatic control of the ships' power stations, equipment and movement. A fully integrated system of combat control of a sub is being developed. The works aimed at automating the surface ships are under way. The modern automated ship controls have high degree of reliability, high survival rate, big volume and high rate of signal processing.

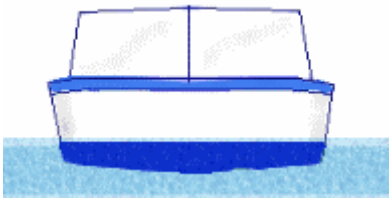
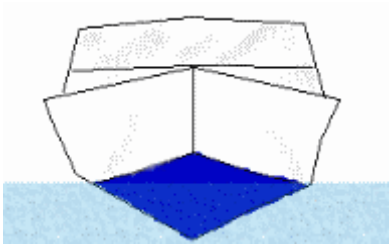
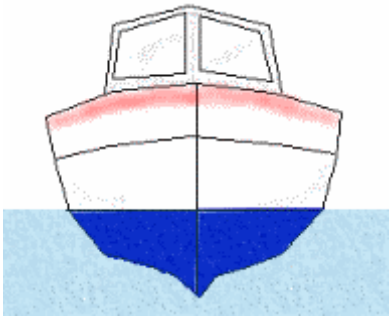
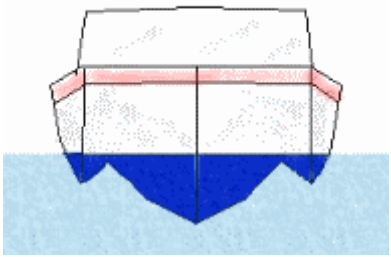
The multi role nature of the large and middle warships as well as the complicated nature of the marine operations excludes the suggestion to make the ships automatic even in the remote future. Therefore the development of the automation of such ships should be based on further integrating separate functional systems, extending their intellectual level and the number of the instruments that can be used. The most perspective direction of automating the ship and introducing robots is ensuring the

viability during combat or operational damages, as well as servicing potentially dangerous units and systems.

Today the tendency of transferring the achievements of the civil shipbuilding to the military sphere is the most important in the world's military shipbuilding. The civil tonnage is 140-150 times bigger than the military one, civil fleet is operated much more intensively, it has much higher safety standards and tough competition between civil ships in the market All this led to the reconsideration of the standards of the military shipbuilding by the main maritime powers from the point of view of benefiting from the civil experience. The leading foreign classification institutions that provide the design rules for the civil ships, started developing the design rules for battle ships. For example, the English Lloyd has issued the first version of such rules. Own rules to some ships' classes have been developed by the Italian Register, Norwegian Veritas and the American Bureau of Shipping.

APPENDIX

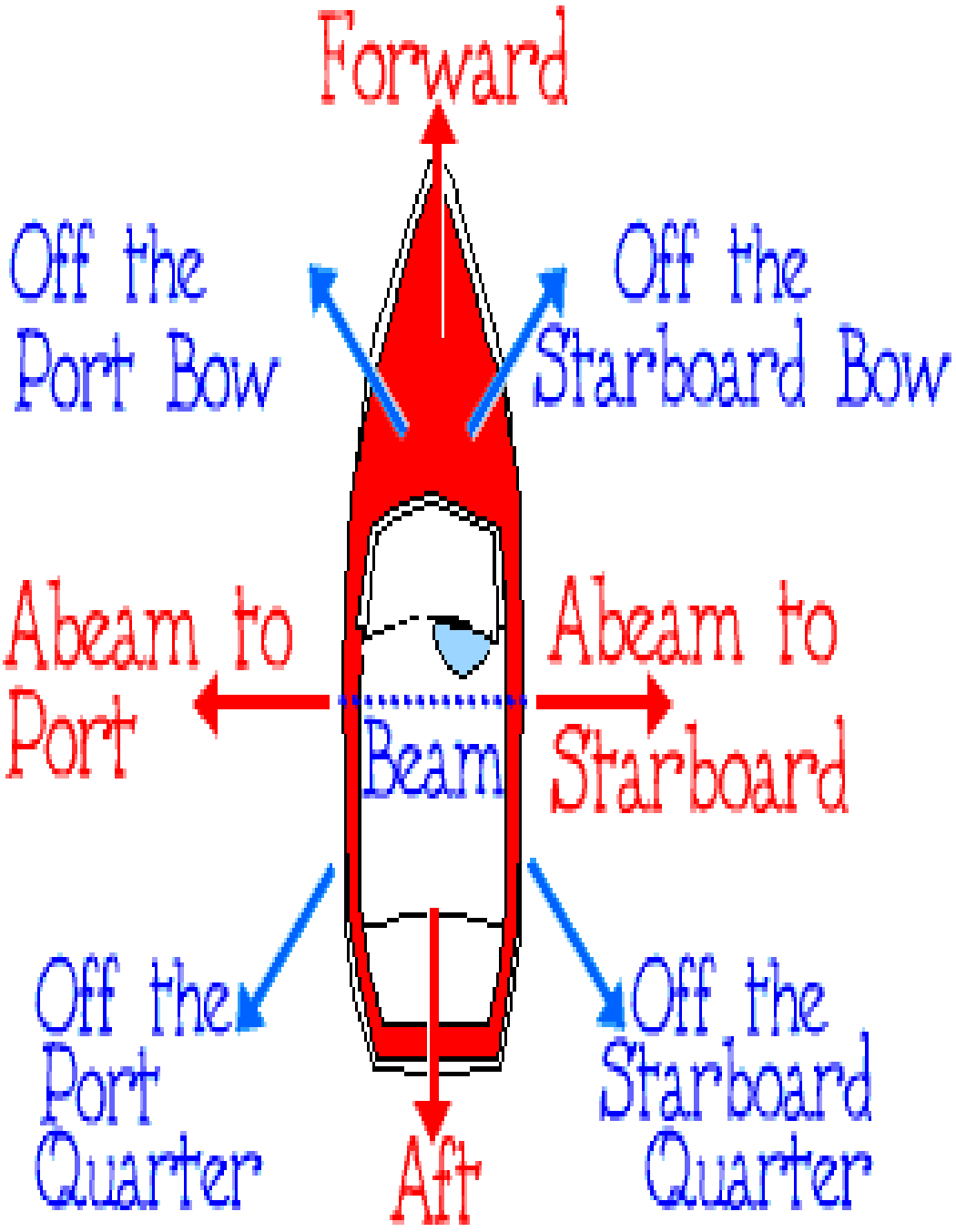
Types of Boat Hulls

	Flat bottom boat - These boats are generally less expensive to build and have a shallow draft (the part of the boat that's under the water). They can get up on plane easily but unless the water is very calm they tend to give a rough ride because of the flat bottom pounding on each wave. They also tend to be less stable and require careful balancing of cargo and crew. Examples of flat bottom boats might be Jon boats, small utility boats, and some high speed runabouts.
	V-bottom boat - The V-bottom tends to have a sharper entry into the water which provides for a smoother ride in rough water. They do, however, require more power to achieve the same speed. Many runabouts use the V-bottom design.
	Round bottom boat - These move easily through the water, especially at slow speeds. They do, however, tend to roll unless they are outfitted with a deep keel or stabilizers. Many trawlers, canoes and sailboats have round bottoms.
	Multi-hull boat - Catamarans, trimarans, pontoon boats and some house boats use a multi-hull design. The wide stance provides greater stability. Each of the hulls may carry any of the above bottom designs.

Major Shipwrecks

Year	Ship	Dead	Disaster
1833	*Lady of the Lake*	2I5	Struck iceberg in N. Atlantic
1852	*Birkenhead*	420	Wrecked off South Africa
1853	*Annie Jane*	348	Wrecked off Scotland
1854	*City of Glasgow*	399	Vanished out of Liverpool
1857	*Central America*	487	Sank on Cuba-New York run
1 858	*Austria*	509	Burned in North Atlantic
1 859	*Pomona*	388	Wrecked off Ireland
1865	*Sultana*	1,653	Exploded on Mississippi R.
1867	58 vessels	1 .000	Hurricane in West Indies
1873	*Atlantic*	300	Wrecked off Nova Scotia
1878	*Princess Alice*	640	Collided in Thames River
1891	*Utopia*	533	Collided at Gibraltar
1895	*Keind Kcyenta*	402	Foundered near Gibraltar
1898	*La Bourgoyne* and *Cromarty shire*	561	Collided off Nova Scotia
1904	*General Slocum*	1 ,030	Burned in East River, N.Y.
1904	*Naye*	651	Wrecked off Scotland
1912	*Titanic*	1,501	Struck iceberg in N. Atlantic
1914	*Empress of Ireland*	1,029	Collided in St. Lawrence R.
1915	*Eastland*	812	Overturned in Chicago
1917	*Mont Blanc*	1,635	Exploded in Halifax Harbour
1931	*St. Fhilibert*	368	Overturned off France
1942	*Curacao*	335	Collided off Ireland
1948	*Kiangya*	1100	Exploded in China Sea
1956	*Andrea Doria*	46	Collided off Massachusetts coast; 1,660 rescued
1958	*Uskudar*	361	Capsized off Turkey
1963	*Thresher*	129	Nuclear submarine sank in Norlh Atlantic
1970	*Mamyomi-Ho*	308	Sank off South Korea
1981	*Tampomus II*	500	Burned and sank in Java Sea
1983	*Tenth of Ramadan*	357	Burned in lake Nasser, Egypt
1986	*Admiral Nakhimov*	398	Collided in Black Sea
1987	*Maria*	390	Sank in Luapula River, Zambia
1987	*Dona Paz*	1,840	Collided near Philippines
1991	*Salem Express*	475	Struck coral reef near Egypt
1993	*Neptune*	800	Capsized off Haiti
1994	*Estonia*	850	Sank off southwest Finland
2000	*Kursk*	118	Nuclear submarine exploded in Barents Sea

Directions of a Boat



Справочные материалы

Официальная классификация военных кораблей США

Условное обозначение	Полное наименование класса	Русский перевод
AALC	Amphibious Assault Landing Craft	**десантный катер на воздушной подушке**
AD	Destroyer Tender	**плавучая база эскадренных миноносцев**
ADG	Degaussing Ship	**судно размагничивания**
AE	Ammunition Ship	**транспорт боеприпасов в том числе ядерных**
AEFS	Fleet Replenishment Ship	**транспорт снабжения универсальный**
AF	Stores Ship	**транспорт продовольствия**
AFDB	Large Auxiliary Floating Dock	**большой плавучий док**
AFDL	Small Auxiliary Floating Dock	**малый плавучий док**
AFDM	Medium Auxiliary Floating Dock	**средний плавучий док**
AFS	Combat Stores Ship	**транспорт снабжения эскадренный**
AG	Auxiliary Ship	**вспомогательное судно общего назначения**
AGB	Icebreaker	**ледокол**
AGER	Environmental Research Ship	**корабль радио- и радиотехнической разведки**
AGDS	Deep Submergence Support Ship	**судно обеспечения глубоководных аппаратов**
AGEH	Hydrofoil Research Ship	**опытовый катер на подводных крыльях**
AGF	Miscellaneous Command Ship	**штабной корабль**
AGM	Missile Range Instrumentation Ship	**плавучий измерительный комплекс судно слежения за ракетами и космическими объектами**
AGOR	Oceanographic Research Ship	**экспедиционное океанографическое судно**

AGOS	Ocean Surveillance Ship	**судно дальнего гидроакустического наблюдения**
AGP	Patrol Craft Tender	**плавучая база катеров**
AGR	Communication Relay Ship	**корабль связи ретранслятор**
AGS	Surveying Ship	**гидрографическое судно**
AGSS	Auxiliary Research Submarine	**исследовательская подводная лодка**
AGT	Training Ship	**учебное судно корабль**
АН	Hospital Ship	**госпитальное судно**
АК	Cargo Ship	**сухогрузный транспорт**
AKF	Armament Store Carrier	**плавучий склад вооружения**
AKL	Light Cargo Ship	**малый сухогрузный транспорт**
AKR	Vehicle Cargo Ship	**транспорт самоходной техники**
AO	Oiler	**танкер**
AOE	Fast Combat Support Ship	**быстроходный универсальный транспорт снабжения быстроходный транспорт комплексного снабжения**
AOFL	Large Fleet Tanker	**танкер-заправщик эскадренный, большой**
AOFS	Small Fleet Tanker	**танкер-заправщик малый**
AOG	Gasoline Tanker	**бензиновоз**
AOR	Replenishment Oiler	**танкер-заправщик**
AOS	Support Tanker	**танкер**
AOT	Transport Oiler	**танкер**
AP	Transport	**войсковой транспорт**
APA	Assault Transport	**десантный войсковой транспорт**
APB	Self-Propelled Barracks Ship	**плавучая казарма самоходная**
APL	Barracks Craft	**плавучая казарма**
AR	Repair Ship	**плавучая мастерская общего назначения**
ARC	Cable Repairing Ship	**кабельное судно**
ARD	Auxiliary Repair Dry Dock	**плавучий док**

ARDM	Medium Auxiliary Repair Dry Dock	**плавучий док средний**
ARG	Internal Combustion Engine Repair Ship	**плавучая мастерская по ремонту двигателей внутреннего сгорания**
ARL	Repair Ship, Small	**плавучая мастерская малая**
ARS	Salvage Ship	**спасательное судно**
AS	Submarine Tender	**плавучая база подводных лодок**
ASPB	Assault Support Patrol Boat	**речной катер огневой поддержки**
ASR	Submarine Rescue Ship	**спасательное судно подводных лодок**
ASXL	Fleet Diving Support Ship	**судно обеспечения подводных спасательных аппаратов**
ATA	Auxiliary Ocean Tug	**океанский буксир вспомогательный**
ATC	Mini-Armored Troop Carrier	**бронированный десантный катер**
ATF	Fleet Ocean Tug	**океанский буксир военный**
ATS	Salvage and Rescue Ship	**спасательное судно**
AVM	Guided Missile Ship	**опытовое судно по испытанию управляемого ракетного оружия**
AVT	Auxiliary Aircraft Landing Training Ship	**учебный авианосец**
AVS/AFS	Stores Support Ship	**транспорт снабжения**
AWL	Aircraft Lighter	**лихтер для перевозки авиационной техники**
BB	Battleship	**линейный корабль**
CA	Gun Cruiser	**крейсер с артиллерийским вооружением**
CCB	Command and Control Boat	**речной катер управления**
CG	Guided Missile Cruiser	**крейсер УРО**
CGH	Guided Missile Cruiser helicopter	**крейсер УРО вертолетоносец**
CGN	Guided Missile Cruiser Nuclear powered	**атомный крейсер УРО**
CHV	Helicopter Carrier	**крейсер-вертолетоносец**
CL	Light Cruiser	**крейсер легкий**

CLG	Guided Missile Light Cruiser	**крейсер УРО легкий**
CLT	Light Cruiser, training	**учебный корабль крейсер**
CPC	Coastal Patrol Craft	**сторожевой катер**
CPIC	Coastal Patrol and Interdiction Craft	**сторожевой катер**
CSL	Crane Stores Lighter	**лихтер, оборудованный кранами**
CV	Multi-purpose Aircraft Carrier	**многоцелевой авианосец**
CVA	Attack Aircraft Carrier	**ударный авианосец**
CVH	Carrier, helicopter	**вертолетоносец**
CVL	Aircraft Carrier, light	**авианосец легкий**
CVN	Multi-purpose Aircraft Carrier nuclear propulsion	**атомный многоцелевой авианосец**
CVS ASW	Aircraft Carrier	**противолодочный авианосец**
CVV	Sea Control Ship	**авианосец многоцелевой средний**
DD	Destroyer	**эскадренный миноносец**
DDG	Guided Missile Destroyer	**эскадренный миноносец УРО**
DDGS	Guided Missile Destroyer ASW	**эскадренный миноносец УРО с развитым противолодочным вооружением**
DDH	Destroyer, helicopter	**эскадренный миноносец-вертолетоносец**
DL	Destroyer Leader	**лидер эскадренных миноносцев** *(Дословный перевод. В послевоенное время первым кораблем с данным обозначением был DL1 Norfolk. Классифицировался как фрегат. Впоследствии все остальные DL стали классифицироваться как destroyer или **CG**. Norfolk был списан до переклассификации и остался единственным DL. В отечественной литературе данный класс переводился как фрегаты. Потом перевод был изменен на крейсера и эсминцы, соответственно переклассификации кораблей.)*
DLG	Guided Missile Destroyer Leader	**лидер эскадренных миноносцев УРО**
DLGH	Guided Missile Destroyer Leader, helicopter	**лидер эскадренных миноносцев УРО с вертолетным вооружением**

DSRV	Deep Submergence Rescue Vehicle	**глубоководный спасательный аппарат**
DSV	Deep Submergence Vehicle	**глубоководный аппарат исследовательский**
DTV	Diving Tender	**водолазное судно**
FACG	Fast Attack Craft-Gun	**артиллерийский катер**
FACM	Fast Attack Craft-Missile	**ракетный катер**
FACT	Fast Attack Craft-Torpedo	**торпедный катер**
FF	Frigate	**фрегат**
FFG	Guided Missile Frigate	**фрегат УРО**
FFGH	Guided Missile Frigate, helicopter	**фрегат УРО вертолетоносец**
FFH	Frigate, helicopter	**фрегат-вертолетоносец**
FFL	Light Frigate	**фрегат малый**
FFP	Patrol Frigate	**фрегат патрульный**
IP	Instrumentation Platform	**плавучая инструментальная платформа**
IX	Unclassified Miscellaneous, self and nonself propelled	**неклассифицированные плавучие средства самоходные и несамоходные**
LCAC	Landing Craft, Air Cushion	**десантный катер на воздушной подушке**
LCC	Amphibious Command Ship	**штабной корабль амфибийных сил**
LCH	Landing Craft, Heavy	**большой десантный катер**
LCL	Landing Craft, Logistic	**десантный катер**
LCM	Landing Craft, mechanised	**танкодесантный катер**
LCP	Landing Craft, personnel	**пехотно-десантный катер**
LCPL	Landing Craft Personnel, large	**большой пехотно-десантный катер**
LCPR	Landing Craft Personnel, ramped	**пехотно-десантный катер с аппарелью**
LCSR	Landing Craft Swimmer	**катер для доставки разведчиков-диверсантов**

	Reconnaissance	**боевых пловцов**
LCU	Landing Craft, utility	**танкодесантный катер**
LCVP	Landing Craft Vehicle personnel	**пехотно-десантный катер**
LFR	Inshore Fire Support Ship	**корабль огневой поддержки десанта**
LHA	Amphibious Assault Ship, general purpose	**универсальный десантный корабль**
LHD	Amphibious Assault Ship, multipurpose	**универсальный десантный корабль**
LKA	Amphibious Cargo Ship	**десантный грузовой транспорт**
LPA	Amphibious Transport	**десантный войсковой транспорт**
LPC	Large Patrol Craft	**большой сторожевой катер**
LPD	Amphibious Transport Dock	**десантно-вертолетный корабль-док**
LPH	Amphibious Assault Ship helicopter	**десантный вертолетоносец**
LPR	Amphibious Transport, small	**быстроходный десантный войсковой транспорт**
LPSS	Amphibious Transport Submarine	**транспортно-десантная подводная лодка**
LSD	Dock Landing Ship	**десантный корабль-док**
LSI	Landing Ship-Logistic	**десантный корабль**
LSSC	Light Seal Support Craft	**катер поддержки боевых пловцов**
LST	Tank Landing Ship	**танкодесантный корабль**
LWT	Amphibious Wrapping tug	**буксировщик поврежденных десантно-высадочных средств**
MCF	Fleet Mine Countermeasure Ship	**морской тральщик**
MCM	Mine Countermeasure Ship	**тральщик**
MHC	Minehunter	**искатель мин**
MHGAT	Minehunter Catamaran	**искатель мин катамаран**
MIUWC	Mobile Inshore Undersea Warfare Craft	**катер прибрежных боевых действий для борьбы с противодесантными средствами**

ML	Mine Layer	**минный заградитель**
MSB	Minesweeping Boat	**катер-тральщик**
MSC	Coastal Minesweeper	**базовый тральщик**
MSD	Minesweeping Drone	**телеуправляемый тральщик**
MSH	Minesweeper/Hunter	**тральщик искатель мин**
MSI	Minesweeper, inshore	**рейдовый тральщик**
MSM	Minesweeper, river	**речной тральщик**
MSO	Ocean Minesweeper	**морской тральщик**
MSS	Minesweeper Support Ship	**корабль поддержки минно-тральных сил**
MSSC	Medium Seal Support Craft	**катер поддержки боевых пловцов средний**
MWL	Motor Water Lighter	**лихтер доставки воды для моторов**
NR	Nuclear Powered Ocean Engineering and Research Vehicle	**малая атомная исследовательская подводная лодка**
PB	Patrol Boat	**сторожевой катер**
PBR	River Patrol Boat	**речной сторожевой катер**
PC	Patrol Craft	**сторожевой катер**
PCF	Patrol Craft, Fast	**быстроходный сторожевой катер**
PCH	Patrol Craft, Hydrofoil	**сторожевой катер на подводных крыльях**
PF	Frigate, Patrol	**фрегат прибрежного действия**
PG	Patrol Combatant	**сторожевой катер**
PGH	Patrol Gunboat, Hydrofoil	**сторожевой катер на подводных крыльях**
PHM	Guided Missile Patrol Combatant, Hydrofoil	**ракетный катер на подводных крыльях**
PTF	Fast Patrol Craft	**быстроходный сторожевой катер**
SDV	Swimmer Delivery Vehicle	**буксировщик боевых пловцов**
SES	Surface Effect Ship	**экраноплан**
SPL	Self Propelled Lighter	**самоходный лихтер**
SS	Submarine,	**подводная лодка дизельная**

	conventionaly-powered	
SSAG	Auxiliary Submarine	**опытовая дизельная подводная лодка**
SSB	Ballistic Missile Submarine, conventionaly-powered	**дизельная ракетная подводная лодка**
SSBN	Ballistic Missile Submarine, nuclear-powered	**атомная ракетная подводная лодка**
SSG	Guided Missile Submarine, conventionaly-powered	**дизельная подводная лодка УРО**
SSGN	Guided Missile Submarine, nuclear-powered	**атомная подводная лодка УРО**
SSN	Submarine, nuclear-powered	**атомная подводная лодка**
SWAL	Shallow Water Attack, light	**катер для действий на мелководье малый**
SWAM	Shallow Water Attack, medium	**катер для действий на мелководье средний**
SWCL	Special Warfare Craft, light	**катер специального назначения малый**
SWCM	Special Warfare Craft, medium	**катер специального назначения средний**
T-AK	FBM Ship Military Sealift Command	**транспорт баллистических ракет КМП США**
TAH	Dependent Support Ship	**судно для перевозки членов семей военно-служащих КМП США**
TAKRX	Maritime Preposition Ship Vehicle Cargo	**плавучий склад боевой техники для обеспечения СБР США**
TAKX	Maritime Preposition Ship Cargo	**плавучий склад тяжелого вооружения для обеспечения СБР США**
T-AGOR	Oceanographic Research Ship	**экспедиционное океанографическое судно КМП США**
T-AGOS	Ocean Surveillance Ship	**судно дальнего гидроакустического наблюдения КМП США**
TCV	Tank Cleaning Vessel	**судно для очистки корабельных топливных цистерн**
TRV	Torpedo Recovery	**торпедолов**

	Vessel	
TWR	Torpedo Weapons Retreiver	**торпедолов**
WAGB	Icebraker	**ледокол БОХР США**
WAGO	Oceanographic Cutter	**океанографическое судно БОХР США**
WHEC	High Endurance Cutter	**патрульный корабль БОХР США**
WLB	Buoy Tender Seagoing	**судно для обслуживания навигационного оборудования в море БОХР США**
WLM	Buoy Tender Coastal	**судно для обслуживания навигационного оборудования в прибрежных водах БОХР США**
WLV	Light Ship	**плавучий маяк БОХР США**
WMEC	Medium Endurance Cutter	**малый патрульный корабль БОХР США**
WPB	Patrol Boat	**патрульный катер БОХР США**
WYT	Harbour Tug	**портовый буксир БОХР США**
YAG	Miscellaneous Auxiliary	**плавучая база**
YC	Open Lighter	**лихтер открытый**
YCF	Car Float	**лихтер для перевозки автомашин**
YCV	Aircraft Transportion Lighter	**лихтер для перевозки авиационной техники**
YD	Floating Crane	**плавучий кран**
YDT	Diving Tender	**водолазное судно**
YED	Floating Dry Dock	**плавучий док**
YED	Yard Floating Dock	**плавучий док заводской**
YEN	Covered Lighter, non self-propelled	**лихтер закрытый несамоходный**
YENB	Large Covered Lighter, non self-propelled	**большой закрытый лихтер несамоходный**
YF	Covered Lighter	**лихтер закрытый**
YENX	Lighter, special purpose non self-propelled	**лихтер специального назначения несамоходный**
YFP	Floating Power Barge, non self-propelled	**плавучая электростанция несамоходная**
YFR	Refrigarated Covered	**лихтер-рефрижератор закрытый**

	Lighter	
YFU	Harbour Utility Craft	**базовое плавучее средство**
YG	Garbage Lighter	**лихтер для сбора мусора**
YGN	Garbage Lighter, non self-propelled	**лихтер для сбора мусора несамоходный**
YHLC	Salvage Lift Craft, heavy, non self-propelled	**судоподъемная платформа несамоходная**
YM	Dredge	**дноуглубительный снаряд**
YMG	Gate Vessel	**бонозаградительное судно**
YNG	Gate Craft, non self-propelled	**боновый заградитель несамоходный**
YO	Fuel Oil Barge	**нефтеналивная баржа**
YOG	Gasoline Barge	**баржа для перевозки бензина**
YOGN	Gasoline Barge, non self-propelled	**баржа для перевозки бензина несамоходная**
YON	Fuel Oil Barge, non self-propelled	**нефтеналивная баржа несамоходная**
YOS	Oil Storage Barge, non self-propelled	**баржа для перевозки и хранения ГСМ несамоходная**
YR	Floating Workshop	**плавучая ремонтная мастерская**
YRB	Repair and Berthing Barge	**ремонтная баржа плавказарма**
YRDH	Floating Dry Dock Workshop Hull	**плавучий док ремонтная мастерская по ремонту корпусов**
YRDM	Floating Dry Dock Workshop, Machine	**плавучий док ремонтная мастерская по ремонту механизмов**
YRR	Radiology Repair Barge	**ремонтная баржа по ремонту радиологической аппаратуры**
YRST	Salvage Craft Tender, non self-propelled	**плавучая база спасательных средств несамоходная**
YTB	Large Harbor Tug	**большой базовый буксир**
YTL	Small Harbor Tug	**малый базовый буксир**
VTM	Medium Harbor Tug	**средний базовый буксир**
YW	Water Barge	**водоналивная баржа**

YWN	Water Barge, non self-propelled	**водоналивная баржа несамоходная**

Справочные материалы

Русско-английский словарь морских терминов

аббревиатуры в названиях военных кораблей	HMS (Her/His Majesty Ship - обязательная приставка перед именем английского военного корабля) USS (United States Ship - обязательная приставка перед именем военного корабля США) CSS (Confederate States Ship - обязательная приставка перед именем военного корабля Южной Конфедерации 1861-65 гг) HMAS (Her/His Majesty Australian Ship - обязательная приставка перед именем австралийского военного корабля) HMCS (Her/His Majesty Canadian Ship - обязательная приставка перед именем канадского военного корабля) HMNZS (Her/His Majesty New Zealand Ship - обязательная приставка перед именем новозеландского военного корабля)
абордаж	boarding (интересно, что это же слово означает и обычную посадку пассажиров)
абордажный крюк	grapnel grapple (более поздний и менее романтический термин; происходит от глагола *to grapple* цеплять)
артиллерийский погреб	magazine
авианосец	aircraft carrier; CV (*CV* - это не сокращение, а условное обозначение *авианосца* по классификации кораблей ВМС США; также есть *CVN - атомный авианосец, CVL - легкий авианосец, CVA - ударный авианосец*) carrier
авианосная ударная группа; АУГ	aircraft carrier battle group carrier battle group

аквалангист	SCUBA diver (от акваланг *Self-Contained Underwater Breathing Apparatus*) frogman (арх.)
барк(а)	barque bark
баркантина	barkentine
баркас	launch long boat
борт (в выражениях "на борт" и "на борту") I	board (*на борт* или *на борту* соответствует *on board*)
борт (боковая часть корпуса) II	side
борт (левый) III	port (!левый борт! очень важный и вызывающий много путаницы термин!)
борт (правый) IV	starboard (!правый борт!очень важный и вызывающий много путаницы термин!)
борт (корабля)	port (!левый борт! очень важный и вызывающий много путаницы термин!) starboard (!правый борт!очень важный и вызывающий много путаницы термин!)
бриг	brig
бригантина	brigantine
броненосец;	battleship (также означает *линкор*)

эскадренный броненосец	ironclad (только ранние *броненосцы* начала и середины XIX века)
буксир	tug
водолаз	diver
водолазная база; водолозное судно	diving tender
Военно-морской флот; военно-морские силы	Navy
волнение	rough seas
дальномер	rangefinder
десант (как операция)	landing (интересно, что это же слово означает и обычную высадку на берег, а также имеет многие другие значения).
десантный катер	amphibious assault craft landing craft
десантный корабль	amphibious assault ship; LHD; LHA (*LHD (amphibious assault ship, multi-purpose)* и *LHA (amphibious assault ship, general purpose)* - это не сокращение, а условное обозначение по классификации кораблей ВМС США) (в отечественной литературе и *LHD*, и *LHA* классифицируются как *универсальные десантные корабли (УДК)*. Это корабли, сочетающие возможности десантного вертолетоносца, десантного транспорта-дока и десантного корабля. Корабли типа *LHD* отличаются возможностью постоянного базирования авиации, морской пехоты, также на них большая по размерам док-камера для десантных катеров) landing ship landing craft carrier (не относится к десантным катерам и другим средствам высадки)

дифферент (разность осадок носом и кормой)	trim
дно	bottom (дно корабля или дно водоема) seabed (морское) riverbed (речное)
дредноут	dreadnought (буквально значит «кошмар». Именно так - "Dreadnought" - назывался первый эскадренный броненосец нового типа, заложенный в Англии в 1904 году. Имя стало нарицательным для всего класса кораблей, но впоследствии в английском вернулись к старому термину *battleship*, а в русском ввели термин *линкор.)*
иллюминатор	porthole
камбуз	galley
катер	craft (!Осторожно, много других значений у этого слова!)(в значении *катер* всегда употребляется в словосочетаниях как то *patrol craft - сторожевой катер, fast attack torpedo craft - торпедный катер* и т.п.)
кок	cook (интересно, что именно так Cook пишется и фамилия капитана Джеймса Кука, так что только благодаря кириллице Владимиру Высоцкому удалась его знаменитая игра слов «хотели кока, а съели Кука»)
классификация кораблей	ship classification (в каждой стране принята своя, оригинальная система *классификации*, даже США и Англия отличаются в этом, особенно велико отличие *классификаций* натовских стран от российской в силу отличий в структуре флота. Забавно, что один из кораблей ВМС США классифицируется как "никакой", то есть даже не "IX - unclassified miscellaneous ships". Этот корабль - исторический парусник USS Constitution)
классификация парусников	sailboat classification

корабельная поисково-ударная группа; КПУГ	hunter-killer group
корвет	corvette (парусный *корвет* или современный *корвет* по классификации европейских стран НАТО)
корма	stern
корпус	hull
крейсер	cruiser; CA; CG (*CA* и *CG* - это не сокращение, а условное обозначение по классификации кораблей ВМС США: *A* в *CA* означает пушечный, а *G* в *CG* означает ракетный. Также *CGN - атомный ракетный крейсер*)
крен	heel list tilt (в основном применяется производное *tilted*)
легкий корпус	outer hydrodynamic hull
ледокол	icebreaker
лихтер	lighter
линкор	battleship; BB (также означает *эскадренный броненосец*) (*BB* - это не сокращение, а условное обозначение по классификации кораблей ВМС США)
люк	hatch
малый противолодочный корабль; МПК	corvette (приблизительное соответствие)

малый ракетный корабль; МРК	fast attack guided missile craft; FACM (*FACM* - это условное обозначение по классификации кораблей ВМС США) fast attack craft corvette (приблизительное соответствие)
матрос	sailor
минный заградитель	mine layer; ML
многоцелевая подводная лодка	attack submarine; SS (*SS* - это не сокращение, а условное обозначение по классификации кораблей ВМС США. Для атомных многоцелевых лодок - *SSN*)
морская пехота	marines (это же слово означает вообще-то любых военных моряков)
морской волк	old salt
морской (корабль, флот)	sea-going
нос	bow
океанский (корабль, флот)	ocean-going
остойчивость (корабля)	stability
отсек (корабля)	compartment
открытое море	high seas
парус	sail belly (термин довольно поэтический, относится к *парусу*, наполненному

	ветром, поскольку основное значение слова *belly* - пузо)
парусник	sailer sailing vessel sailboat
ПЛАРБ; подводная лодка атомная с ракетами баллистическими	nuclear-powered ballistic missile submarine; SSBN (*SSBN* - это не сокращение, а условное обозначение по классификации кораблей ВМС США)
ПЛАРК; подводная лодка атомная с ракетами крылатыми	nuclear-powered cruise missile attack submarine; SSGN (*SSGN* - это не сокращение, а условное обозначение по аналогии с классификацией кораблей ВМС США)
подводная лодка	submarine; SS (*SS* - это не сокращение, а условное обозначение по классификации кораблей ВМС США) electric boat (архаизм; остался в употреблении как часть наименований верфей и ремонтных заводов как General Dynamics Electric Boat Division)
подводные крылья	hydrofoil (*корабль на подводных крыльях* - *hydrofoil craft; hydrofoil ship*)
посадка и остойчивость (корабля)	trim & stability; T&S
прочный корпус	pressure hull inner pressure hull (у двухкорпусных лодок) single pressure hull (у однокорпусных лодок)
ракетный катер	fast attack guided missile craft; FACM (*FACM* - это условное обозначение по классификации кораблей ВМС США) fast attack craft corvette (приблизительное соответствие)

ракетный крейсер	guided missile cruiser; CG (*CG* - это не сокращение, а условное обозначение по классификации кораблей ВМС США. Также *CGN - атомный ракетный крейсер*)
речной (корабль, флот)	river-going (словосочетание *речной корабль* может также переводиться как *river boat* или *river-craft*)
стелс	stealth
сторожевик; сторожевой катер	patrol craft; PC patrol boat; PB coastal patrol craft
тендер	tender (Осторожно! Множество других значений у этого слова помимо морского *тендер-вспомогательный корабль снабжения*)
торпедный аппарат	torpedo tube
торпедный катер	fast attack torpedo craft; FACT (*FACT* - это условное обозначение по классификации кораблей ВМС США) motor torpedo boat; MTB
тральщик	mine-sweeper; MSO; MHC mine countermeasure ship; MCM (*MCM*, *MSO* и *MHC* - это условные обозначения по классификации кораблей ВМС США. Буква О в *MSO* означает океанский класс, С в *MHC* - прибрежный (mine hunter, coastal))
флот	navy (военно-морской *флот* страны) fleet (гражданский *флот* либо соединение боевых кораблей, как то Тихоокеанский *ф.*, 6-й *ф.*)
фрегат	frigate; FF (парусный *фрегат* или современный *фрегат* по классификации НАТО) (*FF* - это не сокращение, а условное обозначение по классификации кораблей ВМС США. Можно отметить также обозначение

	FFG - буква *G* в *FFG* означает наличие ракетного вооружения.
ход (корабля)	speed
шканцы	quarter-deck
шлюп	sloop
шлюпка	launch life boat (спасательная *ш.*)
шхуна	schooner
экраноплан	surface effect ship Wing-in-Ground-Effect Amphibious Craft ekranoplan skimmer (похоже, пока применяют только в фантастической литературе)
эсминец	destroyer; DD; DDG (*DD* и *DDG* - это не сокращения, а условные обозначения по классификации кораблей ВМС США. Буква *G* в *DDG* означает наличие ракетного вооружения)
ют	poop quarter-deck

CALS = Computer-Aided Acquisition and Logistics Support

CCS ES = complex control systems for engineering systems

CIS = Community of Independent States

etc. = et cetera (=and so on)

ft = feet

hp = horsepower

hr (hrs) = hours

IBC = integrated bridge control system

i.e. = id est (=for example)

km = kilometers

km/h = kilometers per hour

kt = knots

kW = kilowatt

La. = Louisiana

lb = libras (=pounds)

LASH = Lighter Aboard Ship

m = metres

mln = million

O/B/O = ore, bulk or oil

O/O = ore or oil

PA = Public Address System

ro-ro = roll on/roll off (ships)

STAC = Stealth Trimaran Aircraft Carrier

sq = square

t = tons

WWI(II) = World War I (II)

£ = pounds

% = per cent

SOME GEOGRAPHICAL AND PROPER NAMES

Acadia Forest – «Акадия форест» *(название корабля)*

Adriatic Sea – Адриатическое море

Arabia – «Аравия» *(название корабля)*

Australia – Австралия

Baku – г. Баку

Baltic sea – Балтийское море

Bore VI – «Бор VI» *(название корабля)*

Brazil - Бразилия

Calais – г. Кале

Canada – Канада

Caribbean sea – Карибское море

Caspian Sea – Каспийское море

Chile – Чили

China – «Китай» *(зд.: название корабля)*

Christopher Columbus – Христофор Колумб

Chunnel – «Чаннел» *(транспортный туннель под Ла-Маншем)*

Cunard Line – «Линия Кунарда» или «Кунард-лайн» *(название компании)*

Dover – г. Дувр

East Indiamen – «Ост-Индцы» *(общее название транспортных кораблей, ходивших в Ост-Индию)*

English Channel – Ла-Манш

Ethiopia – Эфиопия

Far East – Дальний Восток

Great Eastern – «Грейт Истерн» *(название корабля)*

Great Lakes – Великие озера

Halifax – г. Галифакс

Hamburg American Line – «Гамбург Американ Лайн» *(название компании)*

Iraq – Ирак

Japan – Япония

Java – «Ява» *(зд.: название корабля)*

Liberty and Victory ships – корабли классов «Либерти» и «Виктории»

Lithuania – Литва

Liverpool – г. Ливерпуль

Magellan - Магеллан

Malay Archipelago – Малайский архипелаг

Malaysia – Малайзия

Mayflower – «Мэйфлауэр» *(название корабля)*

Mediterranean Sea – Средиземное море

Middle East – Ближний Восток

Mormacsea – «Мормакси» *(название корабля)*

Netherlands – Нидерданды

New Guinea – Новая Гвинея

New Orleans – г. Новый Орлеан

New World – Новый Свет *(историческое название Америки европейцами)*

Normandie – «Нормандия» *(название корабля)*

North German Lloyd Line – «Северогерманская линия Ллойда» *(название компании)*

Norway – Норвегия

Old World – Старый Свет *(Европа)*

Pacific Mail Steamship Company – «Тихоокеанская почтовая пароходная компания» *(название компании)*

Pacific Ocean – Тихий океан

Persia – «Персия» *(зд.: название корабля)*

Pilgrim settlers – пилигримы *(первые английские поселенцы в Америке)*

Pourquoi pas? – «Пурква па» *(зд.: название корабля)*

Queen Elizabeth – «Королева Елизавета» *(зд.: название корабля)*

Queen Elizabeth 2 (QE2) – «Королева Елизавета II» *(зд.: название корабля)*

Queen Mary – «Королева Мария» *(зд.: название корабля)*

Sea Wraith II – «Си Рейт II» *или* «Морской призрак II» *(название корабля)*

Sovereign of the Seas – «Повелитель морей» *(название корабля)*

Strait of Messina – Мессинский пролив

Strathardle – «Стратхардл» *(название корабля)*

United States – «Юнайтид Стейтс» *или* «Соединенные Штаты» *(зд.: название корабля)*

White Star Line – «Линия Уайт Стар» *(название компании)*

VOCABULARY

A

abolish *v* отменять; упразднять; положить конец; уничтожать

abolition *n* аннулирование; избавление; уничтожение; отмена; упразднение

aborigine *n* туземец; абориген

abyss *n* бездна; пропасть; пучина

acceptable *a* приемлемый; подходящий; допустимый

access *v* доступ; подход; проход

accommodation *n* удобство; жилое помещение; жильё; проживание

accomplish *v* выполнять; завершать; доводить до конца; совершать

accuracy *n* точность; правильность; тщательность; пунктуальность

acquisition *n* приобретение; комплектование; присвоение; получение; сбор; обнаружение; установление

adjust *v* регулировать; настраивать; устанавливать; привести в порядок; уладить; приспособить; отрегулировать; установить; выверить; выравнивать; настроить; согласовать; исправлять

~ ment *n* регулирование; согласование; установка; сборка; регулировка; пригонка; настройка; выверка; корректирование; совмещение; изменение; приведение в соответствие

admit *v* признавать; допускать

advisability *n* желательность; целесообразность

affect *v* воздействовать; повлиять

afloat 1) *a* плавающий; плывущий; плавучий

2) *adv* на воде; на море; на поверхности; на плаву; в море

aft 1) *n* задняя часть; корма; кормовая часть; хвост

2) *a* кормовой, задний, хвостовой, обратный

3) *adv* по направлению к корме; за кормой; в корме; на корме

afterpeak *n мор.* ахтерпик

aircraft *n* самолёт; авиация; самолёты

alarm *n* тревога; предупреждение об опасности; будильник; боевая тревога; сигнал тревоги; сигнализация; сигнал

alter *v* изменять; переделывать; чередоваться

amend *v* исправлять; улучшать; внести поправки

ambiguity *n* неясность; двусмысленность; неопределённость; двойственность

amidships 1) *n мор.* мидель; мидель-шпангоут

2) *adv* посередине судна; в районе миделя; в средней части судна

amount *n* величина, количество, итог, результат, значение, важность

ammunition *n* боеприпасы; боезапас; амуниция; военное снаряжение

approach 1) *n* приближение; сближение; подход; метод; способ; принцип; приход; наступление

2) *v* подходить; приближаться; приступать; наступать

appropriate *a* соответствующий; подходящий; надлежащий

arduous *a* трудный; напряжённый; тяжёлый

ascend *v* подниматься; всходить; возрастать; повышаться

ashore *adv* к берегу; на берег; на берегу; на суше

assault (ship) *n* десантный (корабль)

assemble *v* собирать; монтировать

~ ing *n* сборка; установка; монтаж

assign *v* назначать; определять; предназначать; поручать

astern *adv* за кормой; позади; сзади; назад; на (у, по) корме; кормой впёрёд

axis *n* ось

B

barge *n* баржа; барка; шаланда; баркас; катер

barrack *n* казарма

barrel *n* бочка; бочонок; баррель; ствол *(оружия)*

battle ship *n* линейный корабль; линкор

beam *n* луч; балка; бревно; перекладина; *мор.* траверз; ширина судна

beforehand *adv* преждевременно; заранее

benefit 1) *n* преимущество; польза; благо; выгода; прибыль

2) *v* приносить пользу; помогать; выигрывать; приносить прибыль; благоприятствовать

berth *n* койка; спальное место; причал; каюта; место; должность; якорная стоянка; место у причала; пространство для манёвра

building ~ *n* достроечная набережная

bilge 1) *n* выпуклость; днище; трюмная вода; бортовая скула; подводная часть корпуса

2) *a* трюмный; подводный

billion *n* миллиард

bin *n* закром; ларь; бункер; резервуар

bitter *a* горький; сильный; резкий; злой

blast *n* сильный порыв ветра; звук; взрыв; заряд

block 1) *n* агрегат; блок; заграждение; препятствие; элемент

2) *v* преграждать; препятствовать; блокировать; засорять

bobble *v зд.* качаться, прыгать по волнам

body *n зд.* состав; группа; коллектив; количество

boiler *n* бойлер, котел, титан

bow *n* нос корабля

~ sprit *n мор.* бушприт

~ castle *n мор.* носовая надстройка

bracket *n* 1) кронштейн; консоль; опора; скоба; подвеска; консольный подшипник

2) *мор.* бракета; кница; бракет

brave 1) *a* храбрый; смелый; отважный; бравый; доблестный

2) *v* храбро встречать; бросать вызов

bulb *n* судовой бульб; утолщение

~ ous *a* бульбообразный; выпуклый

bulkhead *n* *мор.* переборка *(перегородка)*

bulwark *n* *мор.* фальшборт; волнолом; планширь швертбота

bunker fuel *n* флотское топливо; дизельное топливо на кораблях; тяжёлая фракция мазута; бункеровочное топливо; бункерное топливо; котельное топливо для судов; флотский мазут

butt *n* стык; петля; стыковое соединение

C

canoe *n* каноэ; челнок; байдарка; чёлн; байдара

capability *n* способность; возможность; ёмкость; мощность; производительность; качество; объём;

capacity *n* ёмкость; вместимость; объём; способность; компетенция; качество; положение; возможность; мощность; вместительность; разрядность; грузоподъёмность

captivity *n* пленение; захват

careen 1) *n* крен; подводная часть судна; килевание; кренгование

2) *v* кренить(ся); накренить(ся) *мор.* кренговать; килевать;

cargo *n* груз, карго

carling *n* *мор.* карленгс *тех.* карлингс

carriage *n* экипаж; карета; пассажирский вагон; перевозка;

carrier *n* *мор.* транспортное судно; авианосец;

casting *n* бросание; метание; литьё (процесс и изделие); сбрасывание;

catamaran *n* катамаран

cease *v* прекращать; останавливать;

cell *n* 1) ячейка; клетка; сота

2) келья; обитель; убежище; блиндаж

3) топливный элемент; батарея; датчик

4) отсек; секция

chinaware *n* фарфор

chip *n* щепка; стружка; обломок (камня); осколок; чип; монеты; жетон

christen *v* давать имя; крестить; нарекать

Chunnel *n* транспортный тоннель под проливом Ла-Манш; "Чаннел"

circumferential *a* окружной; кольцевой; окружающий; периферический; круговой

circumstance *n* положение дел; случай; обстоятельство; условие

clinker-built *a* обшитый внакрой

coaming *n* водозащитный порог вокруг люка; комингс

coaster *n* каботажное судно

coble *n* шестивёсельный парусный рыболовный бот; кобль

collapse *v* рухнуть; обвалиться; разваливаться

collier *n* угольщик (судно)

combustion *n* сгорание, горение

commodity *n* продукт; товар; предмет; изделие; груз; польза; удобство

communication *n* связь, коммуникация

compartment *n* отделение, купе, отсек

compatibility *n* совместимость; сочетаемость

complicated *a* сложный; трудный для понимания; запутанный; трудный

comply v исполнять; подчиняться; уступать; соглашаться; удовлетворять (with); отвечать; следовать предписаниям

compound *a* сложный; составной

concave *a* вогнутый; впалый

conciliatory *a* примирительный; умиротворяющий; соглашательский

conducive *a* способствующий; благоприятный

conformity *n* соответствие; согласованность; подчинение;

confuse *v* смущать; приводить в замешательство; запутывать; усложнять; смешать; спутать

conquer *v* завоевывать

conquistador *n ист.* конкистадор

consequence *n* следствие; последствие; результат; вывод

containerize *v* осуществлять контейнерные перевозки; переоборудовать под контейнеровоз; загружать/помещать в контейнеры

contradiction *n* противоречие, несоответствие; конфликт

contour *n* очертание, контур; форма; абрис, линия, профиль

conveyance *n* перевозка, транспортировка

counter *v* противостоять; противоречить, возражать

~ measure *n* контрмера, мера противодействия

craft *n* морское, речное или воздушное судно

crane *n* кран

floating ~ *n* плавучий кран

crate *n* ящик; тара для упаковки

crest *n* гребень, конек, пик, максимум

cripple *v* травмировать, калечить, портить, приводить в негодность

criss-cross 1) *a* перекрещивающийся; скрещенный; перекрестный; пересекающийся;

2) *n* крестик, пересечение, противоположное намерение;

3) *adv* крест-накрест, вкось, криво, набок, наперекосяк;

4) *v* перекрещивать; пересекать; оплетать (крест-накрест)

cruiser *n* крейсер

cruising speed *n* крейсерская скорость

cumbersome *a* неуклюжий, нескладный; громоздкий

cumbrousity *n* неуклюжесть, нескладность

D

dead-wood *n* сухостой, *мор.* дейдвуд, буферный брус (*упора*), помеха

deck *n* палуба

deep *a* глубокий

define *v* определять, давать определение

degaussing ship *n* плавучая станция размагничивания

deliver *v* доставлять, снабжать, поставлять

~ y *n* доставка; поставка; снабжение; подача

derrick *n* деррик-кран, стреловой кран

descend *v* спускаться; сходить; снижаться; опускаться;

designate *v* назначать; обозначить; указать; предназначать;

~ ion *n* обозначение; называние; определение; указание

destination *n* место назначения; цель

destroyer *n* *мор.* эскадренный миноносец; эсминец

detect *v* находить; обнаруживать; замечать; детектировать; зарегистрировать;

detergent *n* моющее средство

deviation *n* отклонение; отступление; уклонение;

differentiate *v* разграничивать; дифференцировать(ся); различать(ся);

dihedral *a* образуемый двумя пересекающимися плоскостями; V-образный

disastrous *a* бедственный; гибельный; катастрофический

dispatch *n* посылка; рассылка; отгрузка

displacement *n* водоизмещение судна

dispose *n* располагать; размещать; расставлять;

dissection *n* диссекция; рассечение; препарирование; вскрытие

distress *n* горе; беда; страдание; нищета; нужда; бедствие

distribute *v* разносить; распределять; распространять;

diversity *n* разнообразие; многообразие; отличие;

dock *n* док; судоремонтный завод;

building ~ *n* (судо)строительный док

floating ~ *n* плавучий док

dominate (over) *v* господствовать; доминировать; преобладать

downwards *adv* вниз; книзу; в сторону уменьшения

drag 1) n медленное движение; землечерпалка; драга; бредень; невод; торможение;

2) *v* тащить; волочить; чистить дно драгой; драгировать; буксировать

drawing *n* план; чертеж

dreadnought 1) *a* неустрашимый

2) *n мор.* дредноут

dredge *n* дноуглубитель; дночерпатель; земснаряд; драга; судно с землечерпальным устройством;

~ r *n* землечерпалка; драга; драгер; устричное судно;

drift *n* дрейф

~ net vessel *n мор.* дрифтер; судно дрифтерного промысла

droplet *n* малое количество; мелкая капля; вкрапление

dry bulk carrier *n мор.* балкер; сухогруз

dual *a* двойной; двойственный; состоящий из двух частей; двуединый

dugout *n* долбленая лодка; долблёнка

dump 1) *n* груда хлама; куча мусора; свалка; помойка;

2) *v* сваливать; вываливать; сбрасывать (мусор);

E

echo-sounder *n* эхолот

elaboration *n* выработка; развитие; уточнение; обработка; разработка;

elimination *n* исключение; выбрасывание; выбывание; устранение; уничтожение

embarkation *n* посадка; погрузка

endure *v* терпеть; переносить; продолжаться; выносить; выдерживать

engine n двигатель; мотор;

enhance *v* увеличивать; усиливать; улучшать; повышать

enormous *a* громадный; огромный;

ensure *v* обеспечивать; гарантировать; ручаться;

enumeration *n* подсчёт; перечисление; нумерация; упорядочение

envisage *v* предусматривать; намечать; предвидеть;

estuary *n* устье; эстуарий; дельта; лиман

evasion *n* уклонение; обход;

exceed *v* превышать; превосходить;

excessive *a* чрезмерный; излишний;

exclude *v* исключить; выбрасывать; выключать; изымать; выдворять; удалять

exhaust 1) *v* истощать; исчерпывать; опустошать;

2) *a* выхлопной; отработанный

3) *n* выхлоп; выпуск;

external *a* наружный; внешний;

extinguisher *n* огнетушитель

extraction *n* извлечение; вытягивание; добывание; экстракция;

extremity *n* конец; край; оконечность; крайность;

F

fabrication *n* производство; изготовление; обработка

facilities *n* средства; условия; льготы; приспособления; аппаратура; программы; производственные мощности; сооружения; площади; оборудование; оснащение

fair *a зд.* благоприятный;

familiarization *n* ознакомление; осваивание; изучение

fan *n* вентилятор; лопасть (воздушного или гребного винта);

ferry *n* паром

car ~ *n* автомобильный паром

Finnish 1) *n* финский язык;

2) *a* финский, финляндский

fit *v* соответствовать; подходить; быть впору; совпадать; приспосабливать; прилаживать; подгонять; подготавливать; снабжать; оснащать

~ ting *n* примерка; пригонка; подгонка; деталь; установка; сборка; монтаж; соединение; штуцер

~ ting out *n мор.* оснащение; снаряжение; достройка (судна после спуска)

flare *n* сверкание; вспышка; сияние; блеск;

~ craft *n* скоростное судно на воздушной подушке, флаеркрафт

flexible *a* гибкий; мягкий; удобоприменимый; эластичный; податливый; универсальный; манёвренный; пластичный; упругий

floatation *n* плавание; плавучесть; всплываемость; проходимость

fluid *n/a* жидкость, текучесть, жидкий, текучий

foam *n* пена;

foil *n мор.* подводное крыло

forepeak *n мор.* форпик

forerunner *n* предшественник; предтеча; *мор.* головной корабль

forming *n* обработка; сгибание; образование; профилирование; формование; формовка; формоизменение; штамповка; фасонирование;

cold- ~ *n* деформирование вхолодную; холодное формование; холодная штамповка; холодное прессование

hot- ~ *n* горячая гибка; горячая прессовка; горячая штамповка; горячая формовка

forwarder *n* экспедитор; отправитель; форвардер; транспортёр; транспортный агент на причале

framework *n* каркас; остов; несущая конструкция; структура; рамки; основа; набор (корпуса корабля);

freeze *v* замерзать; замораживать

freighter *n* фрахтовщик; грузоотправитель; фрахтователь; грузовое судно;

frigate *n* фрегат; сторожевой корабль; лидер эсминнцев; большой противолодочный корабль

fulfill *v* выполнять; исполнять; осуществлять;

funnel *n* дымоход; труба; воронка

G

galley *n мор.* галера; гичка; вельбот; камбуз

galune *n* гальюн *(выступающая вперед носовая надстройка/средневековое судно с такой надстройкой)*

gantry *n* балка на двух стойках; мостик; подставка; портал подъёмного крана;

garbage *n* мусор, отбросы

garboard *n мор.* шпунтовой пояс обшивки; кормовая часть борта судна

gear *n* шестеренка; зубчатая передача

generate *v* производить; генерировать; вырабатывать; образовывать

gently *adv* мягко; тихо; спокойно; кротко; нежно

girder *n* балка; брус; перекладина; ферма (моста); подпорка; балочная ферма; мачта; лонжерон; швеллер; ригель; прогон; пролётное строение моста

glide *v* скользить; двигаться плавно; планировать

~ er *n мор.* глиссер; *авиа* планер

~ ing *n* скольжение; планирование; *мор.* глиссирование

grease *n* сало, смазка, жир

ground *n* земля, грунт

~ effect *n* влияние близости земли; эффект земной подушки

gun *n* пушка, орудие, ружье, огнестрельное оружие

gut 1) *n* узкий проход, канал или пролив; изгиб реки

2) *n* кишки

3) *v* потрошить

H

handle *v* управлять; иметь дело; обращаться; перерабатывать; грузить; обрабатывать; справляться;

hardship *n* невзгоды; нужда; лишение; тяжёлое испытание; трудность;

hatch *n* люк; рыболовная ловушка; шлюзовая камера

haul *v* тянуть; тащить; волочить; буксировать; перевозить; подвозить;

hawser *n* трос; швартов; буксир; перлинь; якорный трос

heat *n* тепло, теплота, жара

heel *n* пятка; пята; *мор.* основание; задняя кромка; статический крен (под действием внешних сил); неудалимые остатки

helicopter *n* вертолет, геликоптер

helmsman *n* рулевой, кормчий

hinge *n* шарнир; петля (напр., дверная); навеска; суть; стержень; намек

hold *n мор.* трюм

horsepower *n* лошадиная сила (единица мощности, равная 746 Вт)

hose *n* шланг, рукав

hovercraft *n* судно на воздушной подушке, ховеркрафт

hull *n* корпус

hunter *n мор.* китобойное судно; поисковый корабль; подводная лодка ПВО; противолодочный корабль

hydrofoil *n* судно на подводных крыльях, гидрофойл

I

ice breaker *n* ледокол

immense *a* огромный; колоссальный; громадный

immerse *v* затоплять; поглощать; погружать(ся); углублять(ся); окунать(ся);

inboard *a* внутри судна; бортовой

incline 1) *n* скат; уклон; склон; наклонная плоскость; наклон; склонность

2) *v* склонять(ся); наклонять(ся); быть склонным;

Indispensable *a* необходимый; обязательный; непременный;

Inferior *a* подчинённый; низший

Infrared *a* тепловой; инфракрасный

Inland *a* внутренний; внутри страны; материковый; континентальный

inseparable *a* неделимый, неотделимый

instrumentation *n* контрольно-измерительная аппаратура; оборудование инструментами; техническое оборудование; приборы

interaction *n* взаимодействие

interdependent *a* взаимозависимый; взаимосвязанный

internal *a* внутренний

item *n* пункт; предмет; номер; наименование; деталь; позиция; статья; единица; изделие; продукт; группа; элемент

J

Japanese *a/n* японский, японец

jet 1) *n* реактивный двигатель; реактивное судно; форсунка; патрубок; насадка; сопло; реактивная струя

2) *a* струйный; инжекционный; реактивный

3) *v* брызгать; бить струёй; двигаться под действием реактивной тяги

jig *n* шаблон; калибр; рыболовный крючок; держатель; зажимное устройство; консоль; приспособление; зажим

joinery n столярная работа; столярное ремесло; столярная мастерская; плотницкая; деревообделочный цех; столярные изделия;

jut *n* выступ; консоль

K

keel *n* киль

~ son *n* кильсон

kit *n* набор деталей, приборов или инструментов

~ -built *a* построенный из готовых деталей

L

landing ship (see: “assault ship”)

launch *v* спускать на воду, запускать, начинать

lay *v* класть; положить; прокладывать (курс корабля)

~ (off) *v* приостанавливать; откладывать (размер); размечать; распланировать; вычерчивать на карте (курс); замерять (длину);

~ (out) *v* проектировать; распланировать; конструировать; прокладывать; провешивать; расположить

~ er *n* слой; пласт; разрез (чертежа); ярус; прослойка

leak *n* протекать

liburne *n* либурна

lie *v* лежать; покоиться; быть расположенным; простираться

light ship *n* плавучий маяк

lighter *n* лихтер

linear ship (see: “battle ship”)

liquid *a/n* жидкий, жидкость

livelihood *n* пропитание; средства к существованию;

loft *n* мастерская; навес; сарай; этаж; нежилое чердачное помещение

~ ing *n* плазовая разбивка (теоретического чертежа корабля на плазе)

Mould ~ *n* плаз

longitudinal *a* продольный

loose *a* свободный; несвязанный; неупакованный; незакреплённый; рассыпной; навалочный;

lounge *n* гостиная; комната отдыха; салон

lumber *n* древесина, пиломатериал, строительный лес

M

machinery *n* машины; детали машины; машинное оборудование

maintain *v* поддерживать; сохранять; содержать; поддерживать в рабочем состоянии; эксплуатировать

maintenance *n* сохранение; текущий ремонт; содержание; техобслуживание

manufacture 1) *v* производить; изготовлять; обрабатывать

2) *n* производство; изготовление; обработка

marking off *n* клеймение; маркировка; разметка; отметка; обозначение

marine 1) *a* морской; судовой; корабельный; океанский; приморский

2) морской флот; солдат морской пехоты; морское дело

margin *n* край; грань; граница; берег; предел; разность; допуск; резерв; запас; ресурс; обочина; поле; рамка (карты)

marshy *a* болотистый, болотный, топкий

match *v* соответствовать; подбирать под пару; сочетать; подходить

merchant 1) *n* купец, торговец, торговое судно

2) *a* торговый, купеческий

metalware *n* металлоизделия; металлоконструкция

mine 1) n рудник; копь; шахта; прииск; мина; подкоп

2) *v* производить горные работы; добывать; вести подкоп; минировать

~ sweeper *n* минный тральщик

missile *n* ракета; реактивный снаряд

guided ~ *n* управляемая ракета

molasses *n* меласса; патока

momentum *n* движущая сила; импульс; толчок; количество движения; механический момент (движущегося тела); инерция; кинетическая энергия; скорость движения; импульс силы

monitoring n контроль; мониторинг; слежение

mooring line *n* причальный конец/трос; швартовный канат; швартов

motor-ship *n* теплоход

mount *v* устанавливать; ставить на возвышении; монтировать

muster *v* собрать; проверить; зачислять; сформировывать

N

navigable *a* судоходный; мореходный; годный для морского плавания

Navy *n* Военно-морской флот

negotiation *n* переговоры; выплата (по чеку, по векселю); заключение (договора, контракта);

notable *a* значительный; знатный; именитый; ощутимый; примечательный;

notch *n* V-образная канавка; отметка; подпил; провал; прорезь; царапина; щербина; вырез; гнездо под шип; зазубрина (засечка)

nozzle *n* носик; горлышко; форсунка; выпускное отверстие; наконечник; патрубок; штуцер; жиклёр; мундштук; насадок; болт; сопло

nuclear *a* ядерный, атомный

numb *a* онемелый; оцепенелый; оконченелый; окостенелый; заледенелый; одервенелый; омертвелый;

O

objective *n* цель; стремление, задача

observer *n* наблюдатель; обозреватель; геодезист-полевик; топограф-полевик

obviously *adv* очевидно

ore *n* руда

order *n* порядок, очередность, орден

outward *a* внешний; наружный; направленный наружу, из порта

overhaul *n* тщательный осмотр; капитальный ремонт; техобслуживание; переборка (двигателя)

overlap *v* перекрывать, перехлестывать

P

package *n* пакет; свёрток; упаковочная тара; контейнер; ящик; коробка; посылка; пачка; блок; модуль; расходы по упаковке;

paddle wheel *n* гребное колесо

partial *a* неполный; частичный; пристрастный; частный; неравнодушный

particular *a* особый; особенный; специфический; исключительный; индивидуальный; частный; отдельный; подробный; детальный; обстоятельный; тщательный

patrol *n* патруль; патрулирование

patronage *n* покровительство; попечительство; шефство; покровительственное отношение; заступничество; патронаж; протекция

payload *n* оплачиваемый, полезный, коммерческий, платный груз

perceive *v* понимать; осознавать; постигать; различать; ощущать; чувствовать; воспринимать

perishable *a* скоропортящийся; подверженный порче

permissible *a* позволительный; допустимый; безопасный

petroleum *n* нефть; бензин; нефтепродукт

pickup *n* подъём; подхват; сбор; подбор; погрузка; вывоз (груза)

pier *n* волнолом; мол; дамба; бык (моста); столб; контрфорс; простенок; пристань; свая; причал; пирс

pierce *v* пронзать; протыкать; прокалывать; буравить; сверлить; пробивать

pipe *n* труба, трубка, патрубок

pitch *n* уровень; степень; сила; напряжение; уклон; скат; наклон; покатость

~ ing *n* килевая качка

pontoon *n* понтон; кессон; поплавок

poop *n* полуют; ют

port *n* 1) порт; гавань; приют; убежище

2) *мор.* иллюминатор; бортовой иллюминатор; орудийный порт; амбразура (башни); левый борт; лацпорт

portable *a* портативный; переносной; ручной; передвижной; съёмный; складной; разборный; транспортабельный

power *n* сила, мощь, власть, энергия

precaution *n* предосторожность; предусмотрительность; *часто мн.* мера предосторожности

precondition *n* предварительное условие; непременное условие; предпосылка

prediction *n* предсказание; прогноз; пророчество

prefabricate *v* изготовлять заводским способом; собирать секции (*здания или подобного большого сооружения*)

~ ion *n* заводское изготовление

priority *n* первенство, преимущество, приоритет, старшинство

process *v* обрабатывать; перерабатывать

propeller *n* пропеллер, винт

properly *adv* должным образом; как следует; правильно

propulsion *n* движение вперед; поступательное движение; движущая сила; *тех.* силовая установка, двигатель

prospective *a* будущий; ожидаемый; грядущий, предполагаемый, предстоящий

prosperity *n* преуспевание, процветание

provision *n* обеспечение, предоставление; снабжение; припасы, запас

pulp 1) *v* размягчиться, набухнуть соком

2) *n* мякоть; мягкая масса

3) *a* низкопробный, дешёвый

pump *n* насос, помпа

purchase *n* покупка; закупка, приобретение

pusher-prop fan *n* толкающий воздушный винт

Q

quarrel *v* придираться, спорить; оспаривать

quarterdeck *n* квартердек, шканечный

R

ramp *n* трап, пандус

ransack *v* искать; обыскивать, обшаривать; рыться в поисках; прочесывать; изучать, подробно исследовать

rate *n* 1) суждение, мнение, оценка (*напр., какого-л. события*)

2) норма; ставка, тариф; расценка, цена

3) пропорция, отношение; коэффициент; степень; процент, доля

4) темп; скорость, ход (*как физическая характеристика*)

5) разряд, класс; сорт

raw *a* сырой, необработанный, сырьевой

receipt *n* квитанция; рецепт; получение (*чего-л. - of*)

reciprocate *v* обмениваться, отвечать взаимностью; двигаться взад и вперед; совершать возвратно-поступательные движения

reduce *v* ослаблять, понижать, сокращать, уменьшать

reefer *n* 1) матрос, берущий рифы; корабельный гардемарин;

2) бушлат (*плотно облегающая двубортная матросская куртка из толстой ткани*)

3) рефрижераторное судно, «рифер»

refine *v* очищать (*от примесей*), рафинировать; повышать качество; усовершенствовать, улучшать (*что-л. - on, upon*)

~ ry *n* очистительный, рафинировочный, нефтеперегонный или рафинадный завод

reinforced *a* армированный, укрепленный, усиленный, утолщенный

regulation *n* регулирование; упорядочение, правило, регламент, предписание, постановление, распоряжение, директива, *мн.* устав; инструкции, обязательные постановления

remote *a* дальний, далекий, отдаленный, дистанционный

render *v* отдавать, воздавать, платить, оказывать услугу, интерпретировать; толковать, переводить (*на другой язык*)

replenishment *n* пополнение, новые запасы, ресурсы

rescue *v* спасать

research *n* (научное) исследование; изучение; изыскание; исследовательская работа

resume *v* возобновлять, продолжать (*после перерыва*); начинать снова

retard *v* замедлять; задерживать; тормозить, медлить; мешкать; запаздывать, опаздывать, отставать

review *n* обзор, обозрение; *воен.* смотр, парад; проверка, просмотр; периодический журнал; *юр.* пересмотр

rib n ребро, *мор.* шпангоут

ridge *n* *что-л., имеющее форму двух пересекающихся наклонных поверхностей* (гребень горы/волны; хребет; горная цепь; водораздел; конек крыши

rigidity *n* жесткость; твердость; упругость

rigorous *a* строгий; неумолимый; безжалостный; суровый; тщательный; неукоснительный

rock *v* качать(ся), колебать(ся); укачивать

roll *v* катить(ся); вертеть(ся), вращать(ся); сворачивать(ся); укатывать, прокатывать (*металл*); вальцевать, плющить; испытывать бортовую качку; идти вразвалку *(часто roll along*); волноваться (*о море*)

~ ling *n* *мор.* бортовая качка; *тех.* катание, прокатка, прокатывание, перекатка

roughness *n* шероховатость, резкость, грубость; суровость, бурное, неспокойное состояние (моря)

row *n* ряд, ярус

runway *n* аппарель, направляющий жёлоб, рольганг; катальный ход; роликовый конвейер; взлётная дорожка; ложе

rudder *n мор.* руль

S

sailing arms *n* парусное вооружение

sailor *n* матрос, моряк

salvage *n* спасение имущества (*при кораблекрушении или пожаре*); подъем затонувших судов

schedule *n* расписание, график

scope *n* масштаб, предел, размах, сфера, область действия

screw *n* болт, винт, шуруп; *мор.* гребной винт

seacoast *n* (морское) побережье

seam *n* шов; стык; спай, фальц

searchlight *n* прожектор

seaworthiness *n* мореходность, годность к плаванию; мореходные качества

section *n* 1) (*поперечное*) сечение, разрез, профиль; срез

2) отрезок; сегмент; часть; секция, деталь (*сооружени, и т. д.*)

secure *v* охранять; защищать; оберегать; гарантировать, обеспечивать

seiner *n* рыбак, использующий невод, сеть; сейнер

sequence *n* последовательность; очередность, порядок (следования)

serfage *n* рабство, неволя

shaft *n тех.* вал, ось, шпиндель

shape *n* форма, очертание

sheer 1) *n мор.* отклонение от курса; кривизна борта, продольная прогибь

2) *v* отклоняться от курса

shell *n* оболочка, обшивка; кожух

~ plating *n* облицовка, обшивка

shipway *n* стапель, эллинг, слип; судоходный канал; канал для морских судов

shipyard *n* верфь, судостроительный завод

shock n удар, толчок; сотрясение; *перен.* потрясение, шок

~ absorber *n* амортизатор

significance *n* важность, значительность; значимость

skipper *n* шкипер, капитан, владелец судна

slamming *n мор.* слеминг (удар о встречную волну)

slide *v* скользить; двигаться плавно

slipway *n мор.* стапель, эллинг, слип

sluice *n* шлюз; перемычка; ворота шлюза; канал, водовод

smart *a* 1) сильный, резкий; интенсивный; острый, жгучий (*о боли*)

2) живой, энергичный; быстрый; проворный

3) толковый, сообразительный, находчивый; остроумный

4) умный, разумный; интеллектуальный; развитой

5) дерзкий, наглый, нахальный, ловкий, хитрый

6) опрятный, аккуратный; подтянутый, нарядный; модный, изящный, элегантный; утончённый

solid *a* твердый, сплошной; цельный, непрерывный, прочный, крепкий; плотный, надежный; солидный, серьезный

sovereign *n* монарх, повелитель, властелин, правитель; владыка, соверен

soybean *n* соя

spare *a* запасной, запасный; резервный; лишний, свободный, дополнительный

specificity *n* специфичность; особенность, своеобразие, специфика

spill *n* проливание, разливание (*жидкости*), разлив *(нефти)*

spin *n* верчение, вращение, кружение

squall *n* шквал; шквалистый ветер, сильное волнение

starboard *n мор.*правый борт (*корабля*)

stealth *n* хитрость, уловка, невидимка, стелс

steam *n* пар, испарение

stem *n* ствол, стебель, черенок, рукоятка, *тех.* стержень, *мор.* нос, форштевень

stern *n мор.* корма

~ post *n* старнпост

stiffener *n* ребро жёсткости; усилитель, жёсткая подкладка или прокладка

stock *n* опора; колодка; рукоятка; штабель; ассортимент товаров; *мор.* баллер (руля); шток (якоря)

store *n* запас, резерв; пакгауз, склад; хранилище; магазин; универмаг

buffer ~ *n* буфер; накопитель; промежуточный склад

strait *n* пролив; узкая часть чего-л.

strand 1) *v* сесть на мель, вить, крутить, скручивать, плести, порвать одну или несколько прядей каната, троса и т. п.

2) n прядь (*каната, троса*); *мор.* стренга (*веревки, из которых свиваются тросы*), жила (*кабеля*), длинный локон, прядь волос

strake *n* желобок; полоса; черта; *мор.* пояс (наружной обшивки); пояс обшивки (наружной); неподвижный дестабилизатор

strap 1) *n* ремень, ремешок; завязка; *мор. авиа* стропа; обхват на подвесной системе; погон

2) *n тех.* крепительная планка; скоба

3) *v* стягивать, пороть, бить, хлестать ремнем

strata *n мн.* напластования, слои

stringer *n* продольная балка; *мор.*; *авиа* стрингер (*особо прочная балка, металлическая конструкция, проходящая через весь корпус корабля, самолета для придания им устойчивости и прочности*)

strive *v* бороться, состязаться, соперничать; спорить, вступать в конфликт

stud *n тех.* распорка; стойка; косяк; обвязка, гвоздь с большой шляпкой, штифт, канцелярская кнопка

subassembly *n* подсистема, сборочный [компоновочный] узел; субблок

subdivide *v* подразделять(ся)

subdivision *n* подразделение

submarine *n* подводная лодка, субмарина

submergence погружение в воду, потопление

submission *n* подчинение, повиновение

superstructure *n* надстройка, *мор.* надпалубные сооружения; судовые надстройки

support *v* поддерживать; помогать, содействовать, способствовать; содержать (*материально*); обеспечивать

survey *n* обозрение, осмотр, землемерная съемка, разведка

sustain *v* 1) быть опорой, подпирать, поддерживать

2) испытывать; нести; переносить, претерпевать; выносить, выдерживать; противостоять

sweeping *n* подметание, уборка, *мор.* траление, заливаемость

non- ~ *n* незаливаемость

switch *v* переключать

T

tank *n* бак, емкость, цистерна, танк

~ er *n* танкер

temperate *a* воздержанный, сдержанный, умеренный

template *n* лекало, образец, трафарет, шаблон

tender *n* *мор.* посыльное судно, плавучая база

three-dimensional *a* трехмерный

thrust *n* боковое или осевое давление

tilt *n* наклон, наклонное положение

timber *n* строительный лес, древесина, *мор.* тимберс

torpedo *n* торпеда

tossing *n* качка; колебание; тряска; подбрасывание

tough *a* жесткий, плотный, крепкий, негнущийся, сильный, прочный, трудный, грубый

trace 1) *n* след, отпечаток, черта, линия; чертеж на кальке, признак, знак

2) *v* набрасывать (*план*), чертить (*карту, диаграмму и т. п.*); снимать копию; следить (*за кем-л., чем-л.*), выслеживать; преследовать (*кого-л.*); обнаружить, установить; разыскать, найти

tramp *n мор.* грузовой пароход, не работающий на определенных рейсах

transition *n* перемещение, переход

transom *n* поперечный брусок; ригель; *мор.* транец (*плоский срез кормы шлюпки, яхты или др. судна*)

transverse *a* пересекающийся, поперечный

trap 1) *n* капкан, силок, ловушка; западня

2) *v тех.* улавливать, поглощать, отделять; останавливать, удерживать

trawler *n* траулер

trial *n* судебный процесс, испытание, проба

trihedral *a* трехгранный, трехсторонний

trim *v мор.* уравновешивать, удифферентовывать (*судно*)

trolley n троллей, блок; шкив; тележка; вагонетка; дрезина

tug 1) *v* тянуть, тащить, буксировать

2) *n* буксир

pusher ~ *n* буксир-толкач

turnover *n* 1) опрокидывание

2) товарооборот

tweendeck *n* твиндек

U

underway *adv мор.* начиная движение

upwards *adv* вверх, наверху

urgent *a* срочный, неотложный

V

valve *n* клапан, заслонка

vehicle *n* транспортное средство, средство передвижения

verification *n* контроль, проверка; сверка, подтверждение

vessel *n мор.* судно

via *prep* через, сквозь; посредством чего-л., с помощью чего-л.

volumetric *a* объемный

W

wander *v* бродить, странствовать, скитаться

warfare *n* война, искусство ведения войны

watch *n мор.* вахта, вахтенный

watertight *a* водонепроницаемый

wear (from) *v зд.* стираться, изнашиваться

weld *v* сваривать

~ er *n* сварщик

~ ing *a* сварка

whale *n* кит

~ factory *n мор.* китобойная база

wheelhouse *n* рулевая рубка

winch *n* лебедка

windage *n* парусность (судна); надводная часть судна; сопротивление ветра; снос ветром

wire *n* провод, проволока, телеграф, телеграмма

Y

yacht п яхта

yaw 1) *v* отклоняться от курса; рыскать

2) *n* отклонение от направления движения, рыскание

yield *v* 1) приносить урожай, давать плоды; давать результат, приводить к ч.-л.

2) сдавать(ся); прекращать сопротивление

Z

zipper *n* застежка-молния, самораспускающийся шов трала

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