

МИНИСТЕРСТВО СЕЛЬСКОГО ХОЗЯЙСТВА
И ПРОДОВОЛЬСТВИЯ РЕСПУБЛИКИ БЕЛАРУСЬ

ГЛАВНОЕ УПРАВЛЕНИЕ ОБРАЗОВАНИЯ,
НАУКИ И КАДРОВОЙ ПОЛИТИКИ

Учреждение образования
«БЕЛОРУССКАЯ ГОСУДАРСТВЕННАЯ
ОРДЕНОВ ОКТЯБРЬСКОЙ РЕВОЛЮЦИИ
И ТРУДОВОГО КРАСНОГО ЗНАМЕНИ
СЕЛЬСКОХОЗЯЙСТВЕННАЯ АКАДЕМИЯ»

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АНГЛИЙСКИЙ ЯЗЫК

HYDROTECHNICAL STRUCTURES

*Рекомендовано учебно-методическим объединением
в сфере высшего образования Республики Беларусь
по образованию в области сельского хозяйства
в качестве учебно-методического пособия
для студентов учреждений образования, обеспечивающих
получение общего высшего образования по специальности
6-05-0811-03 Мелиорация и водное хозяйство*

Горки
Белорусская государственная
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Приведены тексты и упражнения для обучения специальной лексике и развития умений чтения профессиональной литературы.

Для студентов учреждений образования, обеспечивающих получение общего высшего образования по специальности 6-05-0811-03 Мелиорация и водное хозяйство.

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ВВЕДЕНИЕ

Учебно-методическое пособие предназначено для студентов инженерных специальностей. Цель пособия заключается в формировании лексических и грамматических навыков чтения, создании внутреннего профессионального лексикона и потенциального словаря обучаемых, а также развития умений чтения профессионально значимой литературы.

Пособие состоит из 22 уроков (Units), включающих в себя разделы, посвященные словообразовательной работе, разделы, содержащие краткие сведения о грамматическом материале, который активизируется в комплексе упражнений, лексические словари, тексты для чтения и упражнения на проверку понимания содержания и смысла прочитанного.

Текстовый материал позаимствован из зарубежных источников, его тематика определена программой подготовки специалистов инженерного профиля. Комплекс упражнений направлен на формирование компетентной личности инженера средствами иностранного языка.

Данное издание может быть рекомендовано для аудиторной работы и для самостоятельного изучения языка.

UNIT 1

Hydraulic Structures

Словообразование

Суффиксы **-er/-or**, прибавляемые к основе глагола, обозначают орудие действия, лицо, производящее действие, или профессию:

to generate (генерировать) – a **generator** (генератор);

to read (читать) – a **reader** (читатель);

to edit (редактировать) – an **editor** (редактор).

Exercise 1. Form the nouns using the suffixes -er/-or. Translate the nouns into Russian.

Model: to listen – a listener

To tell, to subscribe, to lead, to defend, to advise, to make, to sing.

Model: to visit – a visitor

To create, to initiate, to possess, to dictate, to inspect, to construct.

The Plural Nouns

(Множественное число имен существительных)

Тип окончания	Множественное число
Существительные образуют множественное число, прибавляя к форме единственного числа окончание -s	book – books
Существительные, оканчивающиеся на -o, -ss, -sh, -x, -ch + -es	potato – potatoes, boss – bosses, brush – brushes, match – matches, box – boxes
-f, -fe переходят в v + -es	wolf – wolves, knife – knives
-y (перед ней стоит согласная) переходит в i + -es	lady – ladies
-y (перед ней стоит гласная) – + -s	day – days
Составные существительные: schoolboy (пишется слитно)	schoolboy – schoolboys copybook – copybooks
Составные существительные: sister-in-law (пишется через дефис)	<i>sister</i> -in-law – <i>sisters</i> -in-law (форму множественного числа принимает слово, несущее основной смысл)
Исключения	man – men, woman – women, foot – feet, tooth – teeth, goose – geese, mouse – mice, louse – lice, child – children, deer – deer, sheep – sheep, swine – swine
Слова латинского или греческого происхождения	on – a phenomenon – phenomena
	um – a datum – data, medium – media
	us – i radius – radii, stimulus – stimuli
	is – es crisis – crises, basis – bases
	a – ae antenna – antennae, formula – formulae

Exercise 2. Put the following nouns in the Plural.

A light, a dam, a man, a woman, a canal, a river, a flood, a tractor, a truck, a bank, a facility, a foot, a culvert, a tube, a siphon, a mouse, a knife, a pump, a bus, a negro, a dike, a flume, a datum, a wolf.

Exercise 3. Put the following nouns in the Singular.

Structures, channels, siphons, sizes, radii, regulators, bodies, media, sources, sheep, teeth, children, Germans, deer, dams, peoples, purposes, cars, materials, losses, infrastructures, heroes, radios, photos, rivers.

The Cardinal Numerals (Количественные числительные)

1–12	13–19	20–90	100 и более
1 one	13 thirteen	20 twenty	100 a (one) hundred
2 two	14 fourteen	21 twenty-one	101 a (one) hundred and one
3 three	15 fifteen	22 twenty-two	102 a (one) hundred and two
4 four	16 sixteen	и т. д.	и т. д.
5 five	17 seventeen	30 thirty	200 two hundred
6 six	18 eighteen	40 forty	300 three hundred
7 seven	19 nineteen	50 fifty	400 four hundred
8 eight		60 sixty	и т. д.
9 nine		70 seventy	1,000 a (one) thousand
10 ten		80 eighty	1,001 a (one) thousand and one
11 eleven		90 ninety	1,250 a (one) thousand two hundred and fifty
12 twelve			2,000 two thousand
			2,001 two thousand and one
			2,235 two thousand two hundred and thirty-five
			3,000 three thousand
			4,000 four thousand
			100,000 a (one) hundred thousand
			1,000,000 a (one) million
			1,000,001 a (one) million and one
			1,000,010 a (one) million and ten

1. Числительные от 13 до 19 включительно образуются от соответствующих числительных первого десятка посредством суффикса **-teen**:

four + teen – **fourteen**

При этом числительные **three** и **five** видоизменяются:

three – **thirteen**

five – **fifteen**

Числительные, оканчивающиеся на **-teen**, могут иметь ударение как на первом, так и на втором слоге:

thirteen [θɜːˈtiːn]

Когда такие числительные определяют существительные (относятся к существительным), они имеют ударение на первом слоге:

fifteen ['fiftiːn] books

2. Числительные, обозначающие десятки, образуются от соответствующих числительных первого десятка посредством суффикса **-ty**:

seven + ty – seventy

При этом числительные **two, three, four** и **five** видоизменяются:

two – **twenty**

three – **thirty**

four – **forty**

five – **fifty**

Числительные, обозначающие десятки, имеют ударение на первом слоге:

forty ['fɔːti]

fifty ['fifti]

3. Между десятками и следующими за ними единицами ставится дефис (черточка):

twenty-one

4. Перед числительными **hundred, thousand, million** и **billion** ставится неопределенный артикль **a** или числительное **one**:

a (one) hundred

5. Числительные **hundred, thousand, million** и **billion** не принимают окончания **-s**, когда перед ними стоит числительное **two, three, four, five** и т. д.:

two hundred

three thousand

four million

five billion

Числительные **hundred, thousand, million** и **billion** могут принимать окончание **-s**, когда они выражают неопределенное количество *сотен, тысяч, миллионов, миллиардов*. В этом случае они превращаются в существительные и после них употребляется существительное с предлогом **of**:

Hundreds of students were present at the meeting. – Сотни студентов присутствовали на собрании.

6. В составных числительных в пределах каждого трех разрядов перед десятками (а если их нет, то перед единицами) ставится союз **and**:

305 – three hundred *and* five

675 – six hundred *and* seventy-five

2,075 – two thousand *and* seventy-five

2,005 – two thousand *and* five

1,225,375 – one million two hundred and twenty-five thousand three hundred and seventy-five.

7. При обозначении количественных числительных при помощи цифр каждые три разряда (справа налево) отделяются запятой:

3,734; 2,720,000

Exercise 4. Read the following Cardinal numerals.

A) 14; 20; 21; 25; 3; 1; 11; 13; 12; 100; 145; 378; 478; 567; 692; 704; 803; 958; 1,450; 2,000; 2,981; 4,995; 5,946; 10,005; 11,036; 15,637; 38,482; 59,303; 102,386; 176,986; 274,748; 829,549; 583,087; 684,276; 1,000,001; 1,765,765; 4,888,797; 68,876,389.

B) 28 books; 45 days; 158 computers; 483 people; 753 carpets; 809 tubes; 1,003 groynes; 3,083 sluices; 25,985 canals; 185,382 cups; 593,432 aqueducts; 678,808 sources; 1,858,004 tunnels; 2,234,458,916 trees.

Exercise 5. Read and memorize the following words and word combinations.

aqueduct ['ækwɪdʌkt] – акведук, водопровод

bank protection work [bæŋk prə'tekʃən wɜ:k] – берегоукрепительные работы

barrage ['bærɑ:ʒ] – плотина, запруда

concrete dam [dæm kənkrɪ:t] – бетонная плотина

culvert ['kʌlvət] – водопропускная труба

dam [dæm] – дамба, плотина

disrupt [dɪs'rʌpt] – *зд.* существенно изменить

divert [daɪ'vɜ:t] – направлять по другим каналам; отводить (*воду*)

embankment [ɪm'bæŋkmənt] – высокая земляная насыпь, огражденная дамба, береговой вал

embankment dam [ɪm'bæŋkmənt dæm] – каменно-набросная плотина

endow [ɪn'dau] – предоставлять, даровать

facility [fə'sɪləti] – сооружение

flume [flu:m] – гидротехнический лоток

groyne [grɔɪn] – волнорез, волнолом, рязь

havoc ['hævək] – разрушение, опустошение

hydraulic structure [haɪ'drɔ:lɪk 'strʌktʃə] – гидротехническое сооружение

impound [ɪm'paʊnd] – запруживать (*воду*)
 masonry ['meɪsənri] – каменная кладка
 mass concrete [mæs 'kɒŋkri:t] – бетонный массив
 navigation [ˌnævɪ'geɪʃən] – мореходство, судоходство
 overemphasize [ˌəʊvər'emfəsaɪz] – переоценивать
 pipeline ['paɪpləɪn] – трубопровод
 pump station [pʌmp 'steɪʃən] – насосная станция
 regulator ['regjələɪtə] – шлюз-регулятор (*на канале*), регулирующее
 сооружение
 reinforced concrete [ˌriːn'fɔːst' kɒŋkri:t] – армированный бетон
 rockfill embankment [ˌrɒk'fɪl ɪm'bæŋkmənt] – каменно-набросная
 плотина
 sewerage ['s(j)uːərɪdʒ] – канализация
 siphon ['saɪfən] – сифон
 sluice [sluːs] – гидротехнический затвор (*судоходного шлюза*)
 soil embankment [sɔɪl ɪm'bæŋkmənt] – земляная насыпь
 spur dike [spɜː daɪk] – струеотбойная дамба, поперечная дамба
 streamflow ['striːmfloʊ] – русловой речной сток
 water-conveying structure ['wɔːtə kən'veɪŋ 'strʌkʃə] – гидротехниче-
 ское сооружение для водоснабжения, водопроводящее сооружение
 water-retaining structure ['wɔːtə rɪ'teɪnɪŋ 'strʌkʃə] – водоподпорное со-
 оружение, водохранилищная плотина

Exercise 6. Read and translate the following text.

Water is among the most valuable resources that nature has **endowed** to human beings. Since time immemorial, man continuously developed methods and techniques to harness the benefits of water to protect himself from the destruction that may be caused by the same water. Therefore a **hydraulic structure** must be used for the purposes it was designed for and also be controlled effectively without the risk of causing any **havoc** to the environment. Using water, especially for agricultural purposes, cannot be **overemphasized**.

Hydraulic structures play an important role in drainage, irrigation, and hydraulic projects. If hydraulic structures **fail**, it may cause serious damages of wealth, properties, and environment as well as losses of life and injury to economy. The water related infrastructures are constructed at the aims to facilitate human needs and enhance the quality of life such as **drainage channel, irrigation canal, bank protection work, embankment, dam, spur dike/groyne, bridge, culvert, regulator, barrage, aqueduct, pump station, siphon, and sluice**.

Types of hydraulic structures. Hydraulic structures are structures that are fully or partially submerged in water. The essence of building hydraulic structures is to either **divert, disrupt**, store, or completely stop the natural flow of water bodies. Based on the work they are designed to perform on **streamflow**, hydraulic structures are categorized as **water-retaining structures** (dams and barrages), **water-conveying structures** (artificial channels), and special-purpose structures (structures for hydropower generation or inland waterways).

Water-retaining structures. The dam is a hydraulic structure that all other structures directly or indirectly relied upon. Dams and **barrages** are typical water-retaining structures that are built purposely to **impound** water. The retained water behind dams and barrages could be used for other purposes such as irrigation, recreational activities, **navigation**, and a lot more. There are dams of different sizes and shapes. They are made of various materials such as **soil or rockfill embankment, mass concrete, reinforced concrete, masonry**, and wood. However, based on the construction materials used, dams are broadly classified into **concrete dams** and **embankment dams**. Any artificial **facility** built on the ground with the sole purpose of transporting water diverted from main sources (river and dams) is termed as the water-conveying structure. These types of structures are comprised of canals and tunnels (usually made from soil and rocks) or siphons, aqueducts, **flumes**, and **pipelines** (usually made from concrete and metals). Before the construction of any water-conveying structure, a detailed geotechnical soil test and analysis is recommended to research the surface and sub-surface properties of the soil on which the structure rests. The same soil test and analysis also applies to other types and classes of hydraulic structures to ensure safety and to save resources.

Special-purpose hydraulic structures. Special-purpose hydraulic structures are built as an integral part of hydraulic project to meet a special purpose such as hydropower generation, navigation, fishing, water supply for domestic and industrial uses, **sewerage**, and land reclamation.

Exercise 7. Say whether the following statements are true or false. Correct the false ones using the text.

1. Man always developed methods and techniques to harness the benefits of water. 2. If hydraulic structures fail, it may cause serious losses of life and injury to economy. 3. The essence of building hydraulic structures is only to stop the natural flow of water bodies. 4. The retained water behind dams and barrages could be used for irrigation and navigation. 5. A detailed geotechnical soil test and analysis is recommended to carry out before the construction of any water-conveying structure.

Exercise 8. Translate the following words and word combinations into Russian.

Valuable resources; since time immemorial; environment; agricultural purposes; drainage; irrigation; hydraulic projects; submerged in water; inland waterways; recreational activities; infrastructures; construction materials; purpose of transporting water; canals; tunnels; soil; rocks; concrete; metals; surface and subsurface properties; domestic and industrial uses.

Exercise 9. Translate the words and word combination in brackets into English using the text.

1. Therefore (гидротехническое сооружение) must be used for the purposes it was de-signed for. 2. Hydraulic structures play an important role in (дренаж, орошение) and hydraulic projects. 3. (Дамбы) and (плотины) are typical (водоподпорные сооружения) that are built purposely to impound water. 4. The same (определение свойств почвогрунта) and analysis also applies to other (типы и классы) of hydraulic structures to ensure safety and (сэкономить ресурсы). 5. Based on the (строительные материалы) used, dams are broadly classified into (бетонные плотины) and (каменно-набросные плотины).

Exercise 10. Translate the following words and word combinations into English using the text.

Разрушение; эффективно контролироваться; переоценивать; важная роль; серьёзный ущерб; инфраструктура, связанная с водоснабжением; повысить качество жизни; искусственный канал; частично погруженный в воду; русловой речной сток; судоходство; армированный бетон; струеотбойная дамба; геотехнический; неотъемлемая часть.

Exercise 11. Answer the following questions.

1. Why did man develop methods and techniques to harness the benefits of water? 2. What happens if hydraulic structures fail? 3. What water related infrastructures are constructed to facilitate human needs? 4. What is the essence of building hydraulic structures? 5. How are hydraulic structures categorized? 6. What are dams and barrages as water-retaining structures built for? 7. What are dams of different sizes and shapes made of? 8. What are water-conveying structures comprised of? 9. What are the special-purpose hydraulic structures built for?

UNIT 2

Purposes of Hydraulic Structures

Part I

Словообразование

Суффиксы **-ness** и **-(i)ty** прибавляемые к прилагательному, образуют существительное и обозначают качество или состояние:

soft (мягкий) – **softness** (мягкость);

legal (законный) – **legality** (законность).

Exercise 1. Express in one word using the suffixes -ness and -(i)ty.

Translate the nouns into Russian.

Model: kind – kindness.

White, yellow, black, happy, weary, glad, joyful.

Model: hostile – hostility

Stupid, timid, responsible, rare, equal, fatal, neutral, public.

The Possessive Case (Притяжательный падеж)

единственное число существительного + 's (знак апострофа и буквы s)	famer's house – дом фермера
составные существительные	my mother-in-law's house – дом моей тещи
к существительному в форме множественного числа с окончанием -s, (-es) присоединяется только апостроф.	Countries' export – экспорт стран Но: men's jobs – профессии мужчин

В форме притяжательного падежа могут употребляться существительные, обозначающие:

1) существительные, которые обозначают время (*year, month, day, hour, – one minute's talk*), времена года (*spring, summer, autumn, – winter's cold*), часть суток (*morning, afternoon, evening, – night's travel*), расстояние (*metre, kilometre, – a mile's walk*), стоимость (*five dollars' worth*), вес (*a pound's weight*), наречия времени, такие как (*today, yesterday, tomorrow – today's newspaper*) могут употребляться в притяжательном падеже;

2) понятия: *nature, world, earth, continent, ocean, sea, river* и их названия; *country, town, city* и их названия; *ship, train, plane* и другие средства передвижения и их названия; *названия газет* и др.

Например: *nature's law, the world's major religions, Africa's future, Canada's population, London's museums, the ship's crew, the Guardian's analysis, the Earth's rotation*;

3) сообщества людей: *party, army, family, crew, society, nation, government* и др. Например: *the society's members, the nation's wealth*;

4) *звезды, планеты, спутники*, например: *the moon's surface, the sun's rays*;

5) в технических руководствах форму притяжательного падежа часто принимают существительные, обозначающие движущиеся механизмы или детали конкретного, рассматриваемого изделия:

The piston's motion – движение поршня.

The plane's wing is damaged. – Повреждено крыло самолета.

6) притяжательный падеж могут иметь местоимения, заменяющие одушевленные существительные: *somebody, someone, anybody, anyone, everyone, everybody, nobody, no one* и др. Например: *It's nobody's business.*

7) группу слов, объединенных смысловым значением, или сложное (составное) существительное, где *-s* ставится только с последним элементом:

Prime Minister of England's speech – выступление премьер-министра Англии

father-in-law's bike – велосипед свекра

Exercise 2. Translate the following sentences paying attention to the Possessive Case.

1. The cat's eyes are green. 2. The children's toys are in a big box. 3. My father's birthday is in May. 4. What is that man's name? 5. He showed me his sister's letter. 6. Give me your pupils' exercise books. 7. Bring the children's things. 8. Yesterday the workers found a bird's nest. 9. Whose bag is this? – It is Tom's. 10. We watched TV at my friend's house last night.

Exercise 3. Make the right choice.

1. My aunt is my ... sister.

a) aunt's; b) grandfather's; c) mother's; d) brother's.

2. My cousin is my ... daughter.

a) aunt's; b) mother's; c) sister's; d) brother's; e) father's.

3. My mother has a sister, her son is my... nephew.

a) mother's; b) aunt's; c) sister's; d) brother's.

4. My father has a brother, his daughter is my ... niece.
a) father's; b) uncle's; c) brother's; d) grandmother's.
5. My ... parents are my grandparents.
a) niece's; b) brother's; c) sister's; d) friend's; e) mother's.
6. My ... children are my grandchildren.
a) mother's; b) daughter's; c) father's.
7. Linda is... now. Do you want me to call her?
a) at Paul's; b) at Paul'; c) house of Paul.
8. ... was amazing! I am happy for them.
a) Paola's and Frank's wedding;
b) Paola and Frank's wedding;
c) Paola and Frank' wedding.

Конструкция **существительное + of + существительное** выражает отношение принадлежности. Существительное после предлога при переводе на русский язык обычно имеет форму родительного падежа, например: *the house of my friend* – дом моего друга

Exercise 4. Transform the sentences using the noun + of + noun construction.

Model: My neighbours' farm. – The farm of my neighbours.

1. My friend's house. 2. Our government's policy. 3. Three hours' conversation. 4. Tom's teacher. 5. Japan's economy. 6. These boys' new pens. 7. The children's room. 8. Jack and Sue's car. 9. Mark's keys. 10. Five miles' walk. 11. Jane's notebook. 12. Our guests' suitcases.

The Ordinal Numerals **(Порядковые числительные)**

Порядковые числительные образуются путем прибавления окончания **-th** к количественному числительному:

four – the **fourth** (четыре – четвертый)

eleven – the **eleventh** (одиннадцать – одиннадцатый)

Исключения:

one – the **first** (один – первый)

two – the **second** (два – второй)

three – the **third** (три – третий)

five – the **fifth** (пять – пятый)

eight – the **eighth** (восемь – восьмой)

nine – the **ninth** (девять – девятый)

twelve – the **twelfth** (двенадцать – двенадцатый)

При образовании порядковых числительных, которые оканчиваются на **-y** (т. е. все числительные, обозначающие десятки, начиная с 20), конечная **y** меняется на **i**, и перед окончанием **-th** добавляется **e**:

eighty – the **eightieth** ['eɪtɪəθ] – (восемьдесят – восьмидесятый)

ninety – the **ninetieth** ['naɪntɪəθ] – (девяносто – девяностый)

При образовании составных порядковых числительных последний разряд выражается порядковым числительным с окончанием **-th**, а предшествующие разряды – количественными числительными (как и в русском языке):

21st – the **twenty-first**

142nd – the one hundred and forty-**second**

3,665th – the three thousand six hundred and sixty-**fifth**

421st – the four hundred and twenty **first**

5,111th – the five thousand, one hundred and **eleventh**

Когда порядковые числительные пишутся в виде числа, обычно к числу добавляются последние две буквы соответствующего порядкового числительного:

the first = **1st**

the second = **2nd**

the third = **3rd**

the fourth = **4th**

the twenty sixth = **26th**

the one hundred and first = **101st**

Exercise 5. Match the pairs of the Ordinal numbers.

1. the 30th

a) the forty-ninth

2. the 2nd

b) the sixty-eighth

3. the 17th

c) the thirtieth

4. the 81st

d) the fifth

5. the 5th

e) the second

6. the 23rd

f) the eighty-first

7. the 49th

g) the seventy-fourth

8. the 116th

h) the twenty-third

9. the 74th

i) the seventeenth

10. the 68th

j) the one hundred and sixteenth

Exercise 6. Read and memorize the following words and word combinations.

advance [əd'vɑ:ns] – увеличить

adverse ['ædvɜ:z] – неблагоприятный, вредный

coastal storm surge ['kəʊstəl stɔ:m sɜ:dʒ] – прибрежный штормовой нагон

downstream [ˌdaʊn'stri:m] – в нижнем течении (*реки*)
 flood control [flʌd kən'trəʊl] – борьба с наводнениями
 flood control structure [flʌd kən'trəʊl 'strʌktʃə] – противопаводковое
 сооружение
 GW gigawatt ['gɪɡə,wɒt] – гигаватт
 inundate ['ɪnʌdeɪt] – затоплять, наводнять
 levee ['levi] – дамба обваловывания, берегозащитная дамба
 lock [lɒk] – шлюз (*на реке, на канале*)
 maintenance ['meɪntənəns] – техническое обслуживание
 multipurpose hydraulic structure [ˌmʌltɪ'pʊz:əs haɪ'drɒ:lɪk 'strʌktʃə] –
 комплексный гидроузел
 pathway ['pa:θweɪ] – проход, маршрут
 power generation ['paʊə,dʒenə'reɪʃən] – производство электроэнергии
 reservoir ['rezəvɔɪ:] – бассейн, водохранилище
 shipping vessel ['ʃɪpɪŋ'vesəl] – торговое судно, танкер
 storage reservoir ['stɔ:ɹɪdʒ 'rezəvɔɪ:] – водосборный бассейн
 straighten out ['streɪtən aʊt] – выпрямлять, исправить
 topography [tə'pɒɡrəfi] – рельеф (*поверхности*), топография
 upstream [ʌp'stri:m] – в верхнем течении (*реки*)
 water conveyance ['wɔ:tə kən'veɪəns] – система водоснабжения

Exercise 7. Read and translate the following text.

Hydraulic structures are designed for managing and controlling the flow of water in natural and built environment systems. Moreover, the primary purposes may include the following **flood control**, **water conveyance**, irrigation, navigation, **power generation**, domestic and industrial purposes, environment protection and recreation.

Flood control. Flooding is a widespread natural disaster that occurs when water **inundates** land that is usually dry. It can occur due to various reasons, including heavy rainfall, melting of snow, **coastal storm surges**, or the failure of dams and **levees**. The effective way of flood control and reducing its negative impacts is by the construction of dams, water conveyance structures, culverts, canals, and **reservoirs**. In the designing and building of **flood control structures**, some vital point of views must be taken into consideration in such way that the cost of construction of such a project structure should be of benefit. Also, the flood control structures should be reliable and effective as predicted. Even in some instance, the methods of controlling floods should rather be automatic, not manual.

Power generation. Hydropower generation is the production of electrical energy from running water through turbines without reducing its quantity. It has been demonstrated that hydropower generated about 16.4% of the glob-

al total electricity supply equivalent to the installed capacity of about 1064 GW. The hydropower system is the leading global source of an estimated 71% of total renewable energy. Furthermore, hydropower plant reservoirs can also be used as a tool in minimizing the **adverse** impacts of climate change and in achieving sustainable development goals.

Navigation. Inland water transportation plays a significant role in the national and global markets. Building dams and draining of river streams will considerably raise the capacity of inland water transportation, thereby allowing the smooth movement of a **shipping vessel**. An important point to note is that a chain of **storage reservoirs** can **advance** navigation depth, **straightening out** navigation channels, and support the passage of both small, medium, and even large ships. However, it is recommended to provide **pathways** or **locks** for vessels when dam structures are built on a large river stream for easy navigation from **upstream** to the **downstream**. Also, the **topography** of the surrounding environment should be taken into consideration. Hence, the pathways might be an integral part of the dam or a completely different structure.

Irrigation schemes. Recently, it was reported that about 20% of the global total arable land is under different forms of irrigation schemes. More than 70% of freshwater withdrawn from rivers is utilized for irrigating crops, and 75% of the total water hardly returns to the rivers. In many regions of the world, with water scarcity, farming without irrigation would not be possible. In the present world, irrigation projects depend on the supply from **multipurpose hydraulic structures**, reservoirs, and rivers. For irrigation schemes to be successful, the water supply from sources must be adequately available whenever needed and at a reasonable cost of investment. Also, the operation and **maintenance** of such a structure should be smooth and cost-effective.

Exercise 8. Translate the following words and word combinations into English using the text.

Управление и контроль; экологические системы; стихийное бедствие; обильные осадки; борьба с наводнениями; стоимость строительства; электроснабжение; перевозка водным транспортом; судоходные каналы; речной поток; возобновляемая энергия; виды оросительных систем; недостаток воды; окружающая среда; многоцелевая гидравлическая плотина; водохранилище; техническое обслуживание.

Exercise 9. Complete the sentences using the text.

1. Moreover, the primary purposes may include the following ____ .
2. Even in some instance, the methods of controlling floods ____ .

3. The hydropower system is the leading global source ____ .
4. Building dams and draining of river streams will considerably ____ .
5. Also, the topography of the surrounding should ____ .

Exercise 10. Translate the words and word combination in brackets into English using the text.

1. The effective way of flood control and (снижение его негативных последствий) is by the construction of dams, (водопроводящие сооружения, кульверты), canals, and reservoirs.

2. (Выработка электроэнергии на ГЭС) is the production of electrical energy from (подача воды через турбины) without reducing its quantity.

3. However, it is recommended to provide (проходы или шлюзы для судов) when dam structures are built on a large river stream for easy navigation (от верхнего течения к нижнему).

4. (Чтобы оросительные системы были успешными), the water supply from sources (должны быть доступны в достаточном количестве) whenever needed and at a (приемлемая цена) of investment.

Exercise 11. Translate the following words and word combinations into Russian.

Hydraulic structures; irrigation; flood control; freshwater; coastal storm surge; water conveyance; environment protection; reliable and effective; dams and levees; reservoirs; renewable energy; shipping vessel; storage reservoirs; navigation depth; navigation channels; pathways or locks for vessels; topography; irrigation projects; operation and maintenance.

Exercise 12. Answer the following questions.

1. What are the primary purposes of hydraulic structures? 2. What are the reasons for flooding? 3. What is the effective way of flood control and reducing its negative impacts? 4. What must be taken into consideration in the designing and building of flood control structures? 5. What can hydropower plant reservoirs be used as a tool for? 6. What can a chain of storage reservoirs be applied for? 7. What do irrigation projects depend on in the present world?

Exercise 13. Find in group B the synonyms to the words in group A.

A. Production; quantity; vessel; goal; successful; farming; equivalent; construction; inland; failure; primary.

B. Principal; breakdown; building; manufacture; amount; identical; objective; interior; ship; agriculture; prosperous.

UNIT 3

Purposes of Hydraulic Structures

Part II

Словообразование

Суффикс **-ment**, прибавляемый к глаголу, обозначает процесс, результат действия или состояние:

to settle (поселиться) – **settlement** (поселение);

Exercise 1. Form the nouns using the suffix -ment. Translate them into Russian.

Model: to pay – payment

To resent, to assign, to employ, to develop, to astonish, to achieve.

Суффиксы **-hood** и **-ship**, прибавляемые к существительным, обозначают состояние:

child (ребенок) – **childhood** (детство);

owner (собственник) – **ownership** (собственность).

Exercise 2. Form the nouns using the suffix -hood and -ship. Translate them into Russian.

Model: brother – brotherhood

Lady, woman, mother, man, baby, boy, father, parent, sister, girl.

Model: leader – leadership

Comrade, relation, professor, citizen, member, friend, author, editor.

The Degrees of Comparison of Adjectives (Степени сравнения прилагательных)

Виды	Положительная	Сравнительная	Превосходная
1) односложные 2) двухсложные прилагательные, оканчивающиеся на -y, -er, -ow, -le.	big happy clever simple narrow	bigger happier cleverer simpler narrower	the biggest the happiest the cleverest the simplest the narrowest
3) многосложные прилагательные	famous successful interesting	more famous more successful more interesting	the most famous the most successful the most interesting
4) исключения	good bad little many, much far	better worse less more farther, further	the best the worst the least the most the farthest, the furthest

The Constructions of Comparison (Сравнительные конструкции)

than – чем	Minsk is larger than Mogilev.
as ... as – такой(-ая) же ... как и	Mogilev is as large as Brest.
not so ... as – не такой(-ая) ... как	Vitebsk is not so large as Minsk.
the + <u>прилагательное в сравнительной степени</u> , the + <u>прилагательное в сравнительной степени</u> – чем ..., тем.	The more we want, the less we get.

Exercise 3. Supply the comparative and superlative forms of adjectives.

Big, wide, easy, brave, good, active, nervous, fine, powerful, efficient, dirty, beautiful, old, long, little, new, much, many, high, comfortable, deep, cold, large, short, interesting, possible, warm, young, far, happy, low, tall.

Exercise 4. Translate the following sentences into Russian.

1. Tony is taller than Colin. 2. Gold is more expensive than silver. 3. It's more comfortable to go by car than by train. 4. I feel better today. 5. These shoes are much nicer than those ones. 6. The movie is worse than the book. 7. It was a bit warmer yesterday. 8. France is a little bigger than Great Britain. 9. I'm far more interested in computers than in art. 10. You should take it less seriously. 11. This is the least effective method.

Exercise 5. Choose the right variant.

1. My girlfriend is (taller, the tallest) than me.
2. I'm (younger, the youngest) of the family.
3. Can you show me (shorter, the shortest) way to the post-office?
4. It's (more expensive, the most expensive) house I've ever seen.
5. What is (larger, the largest) city in your country?
6. My mother is (older, the oldest) than my father.
7. Mr. Brown is much (older, the oldest) than I expected.
8. Surabaya is (bigger, the biggest) than Bandung.
9. Love is (more valuable, the most valuable) thing in our life.
10. She's (more beautiful, the most beautiful) girl in our class.

The Dates in English (Чтение дат по-английски)

1. Годы, в отличие от русского языка, обозначаются количественными числительными следующим образом:

1900 г. – nineteen hundred

1904 г. – nineteen hundred and four

1915 г. – nineteen fifteen (nineteen hundred and fifteen)

1949 г. – nineteen forty-nine (nineteen hundred and forty-nine).

Слово **year** после обозначения года не употребляется, но иногда употребляется перед ним:

в 1915 г. – in the year nineteen fifteen.

2. Даты обозначаются порядковыми числительными:

15 мая 1948 года – the fifteenth of May, nineteen forty-eight или May the fifteenth, nineteen forty-eight.

Даты могут строиться двумя способами: месяц день, год (используется преимущественно в США) и день, месяц, год (стандартно). Обратите внимание, что в первом случае запятая ставится только между днем и годом, а во втором запятые не употребляются. Если дата отвечает на вопрос *когда?*, то перед ней ставится предлог **on**:

April 1, 2000 (April the first, two thousand) – первое апреля 2000 года

1 April 2000 (the first of April, two thousand) – первое апреля 2000 года

on 1 April 2000 (on the first of April, two thousand) – первого апреля 2000 года

Если в дате отсутствует число, то между названием месяца и годом запятая не ставится, а перед месяцем употребляется предлог **in**:

in March 2003 – в марте 2003 года

3. Века, как правило, прописываются полностью и с маленькой буквы:

the nineteenth century – девятнадцатый век

the seventh and eighth centuries – седьмой и восьмой века

Exercise 6. Read in English the following sentences.

1. My son was born on __ (02.12.2000). 2. Our dog was born on __ (21.08.2008). 3. My granddad was born on __ (23.06.1900). 4. My granny was born on __ (18.02.1910). 5. The Women's Day is on __ (08.03). 6. Victory Day is on __ (09.05). 7. Christmas in Russia is on __ (06.01). 8. Christmas in America is on __ (25.12). 9. Epiphany ['ɪpɪfəni] in Russia is on (19.01). 10. The Defender of Fatherland Day is on __ (23.02).

Exercise 7. Read and memorize the following words and word combinations.

aquatic food supply [ə'kwætɪk fu:d sə'plaɪ] – снабжение пищевой продукцией из водных биоресурсов

bacterial purity [bæk'tɪəriəl 'pjʊərəti] – микробиологическая чистота

canoeing [kə'nu:ɪŋ] – плавание на каноэ

cost-effective [ˌkɒstɪˈfektɪv] – рентабельный
 environmentally friendly [ɪnˌvaɪərənˈmentəli ˈfrendli] – экологически
 безопасный; не наносящий ущерба окружающей сред
 hydropower supply [ˈhaɪdrəʊˌpaʊə səˈplaɪ] – гидроэлектроснабжение
 hardness [ˈhɑːdnəs] – жесткость
 immediate needs [ɪˈmiːdiət niːdz] – неотложные потребности
 in terms of [ɪn tɪˈzːmz əv] – по таким показателям, как
 large capacity storage structure [lɑːdʒ kəˈpæsəti ˈstɔːrɪdʒ ˈstrʌktʃə] – во-
 доохранилища большой емкости
 mineral mining [ˈmɪnərəl ˈmaɪnɪŋ] – добыча полезных ископаемых
 processing [ˈprəʊsesɪŋ] – переработка
 public water consumption [ˈpʌblɪk ˈwɔːtə kənˈsʌmpʃən] – коммуналь-
 ное водопотребление
 pulp [pʌlp] – бумажная масса, целлюлоза; древесная масса
 rainfall run-off [ˈreɪnfɔːl ˈrʌnɒf] – дождевой сток
 river basin [ˈrɪvə ˈbeɪsn] – речной бассейн
 scuba diving [ˈskuːbə ˈdaɪvɪŋ] – погружение с аквалангом
 teeming population [ˈtiːmɪŋ ˌpɒpjəˈleɪʃən] – многочисленное население
 thermal power plant [ˈθɜːməl ˈpaʊə plaːnt] – ТЭС (*тепловая электро-
 станция*)
 water management [ˈwɔːtə ˈmænɪdʒmənt] – водопользование

Exercise 8. Read and translate the following text.

Municipal and industrial water supply. A large quantity of freshwater is being consumed daily by food industry; **mineral mining and processing**; textile, paper, and **pulp** industries; nuclear and **thermal power plants**; and pharmaceutical, petrochemical and metallurgical industries. However, some of the major industries that use a large volume of water are nuclear and thermal power plants. To meet both domestic and industrial needs, due to the higher demand for water by many industries, especially in industrially developed nations, **large capacity storage structures** are always built to store local **rainfall run-off** and water diverted from other **river basins**. Multipurpose hydraulic structures are the primary storage facilities and sources of most water supply for domestic and industrial purposes.

Although **public water consumption** constitutes nearly only 10% of the water consumed by the industries, still the **immediate needs** of public water supply must be taken seriously. The water supply from hydraulic projects should always meet the standards of quality required for domestic and industrial uses **in terms of** its color, taste, **hardness**, odor, and **bacterial purity**. Also, the treatment methods for the water should be **cost-effective** and

daily available all year round. Necessary control and protection measures should be provided in the river basin areas where the hydraulic project is sited which are mainly for the municipal water supply. There is also a need for hydraulic projects in a region with the seasonal variation of rainfall distribution of the year.

Environment protection. Another vital reason for hydraulic projects is for environmental protection and **water management**, which may include farmland improvement by controlling soil erosion; **environmentally friendly hydropower supply**; improved quality water supply for human, animal, and industrial consumption; **aquatic food supply**; and recreational development. Nevertheless, the negative impacts posed by the massive hydraulic structures on the environment and public safety should always be considered in the course of design and construction processes. The environmental issues are essential for the well-being of people living around the hydraulic projects and for the neighboring flora and fauna.

Recreation and other purposes. Many hydraulic projects also serve as a place for tourism, recreational, and sports activities. In fact, in some countries, sometimes hydraulic projects are specially constructed for recreation purposes. Some recreational activities carried out at the hydraulic project sites might include swimming, fishing, boating, **canoeing**, **scuba diving**, and lakeside walking. Recreational activities provide job opportunities to the **teeming population** and generate incomes to the government and, at the same time, conserve the natural environment.

Exercise 9. Insert the necessary words given below the line.

1. However, some of the major industries that use a large volume of water are nuclear and _____. 2. Large capacity storage structures are always built to store local _____ and water diverted from other river basins. 3. Necessary control and protection measures should be provided in the _____ areas where the hydraulic project is sited. 4. The _____ are essential for the well-being of people living around the hydraulic projects. 5. Many _____ also serve as a place for tourism, recreational, and sports activities.

Hydraulic projects; environmental issues; river basin; rainfall run-off; thermal power plants.

Exercise 10. Translate the following words and word combinations into Russian using the text.

Thermal power plants; large volume of water; large capacity storage structures; local rainfall run-off; water supply for domestic and industrial purposes; public water consumption; bacterial purity; environmental protec-

tion; water management; treatment methods for water; municipal water supply; aquatic food supply; controlling soil erosion; industrial purposes; in terms of; hardness; environmental issues; job opportunities; public safety.

Exercise 11. Match these words and expressions with their Russian equivalents.

- | | |
|--------------------------|--------------------------------|
| 1) pulp industry | a) негативные последствия |
| 2) demand for water | b) гидротехнические сооружения |
| 3) hydraulic structures | c) распределение осадков |
| 4) water supply | d) гидроузел |
| 5) rainfall distribution | e) водопользование |
| 6) water management | f) потребность в воде |
| 7) negative impacts | g) целлюлозная промышленность |
| 8) hydraulic project | h) водоснабжение |

Exercise 12. Choose the correct option to complete the sentences.

1. Multipurpose hydraulic ... are the primary storage facilities and sources of most water supply.

a) sources; b) structures; c) facilities.

2. Also, the treatment ... for the water should be cost-effective and daily available all year round.

a) purposes; b) impacts; c) methods.

3. There is also a need for hydraulic projects in a region with the seasonal ... of rainfall distribution of the year.

a) rainfall; b) variation; c) region.

4. In fact, in some countries, sometimes hydraulic projects are specially constructed for ... purposes.

a) country; b) recreation; c) project.

5. Some recreational activities carried out at the hydraulic project sites might include ..., fishing, scuba diving.

a) tourism; b) income; c) swimming.

Exercise 13. Answer the following questions.

1. What industries consume much freshwater daily?

2. What structures are built to meet domestic and industrial needs by many industries?

3. What are multipurpose hydraulic structures made for?

4. What water quality standards should be met when supplied from hydraulic projects?

5. What recreational activities are carried out at the hydraulic project sites?

6. What benefits do recreational activities provide?

UNIT 4

Challenges Facing Hydraulic Structures

Словообразование

Суффиксы **-ance (-ence)**, прибавляемые к глаголу, обозначают действие, состояние или качество:

to disturb (нарушить) – **disturbance** (нарушение);

to refer (ссылаться) – **reference** (ссылка);

to ignore (игнорировать) – **ignorance** (невежественность).

Exercise 1. Form the nouns using the suffix -ance (-ence). Translate them into Russian.

Model: to allow – allowance

To assist, to resist, to inherit, to appear, to annoy, to avoid, to accept.

Model: to differ – difference

To indulge, to interfere, to adhere, to insist, to persist, to correspond.

Суффиксы **-ion (-tion, -ation)**, прибавляемые к глаголу, обозначают состояние, процесс или результат действия:

to oppress (подавлять) – **oppression** (гнёт);

to educate (обучить) – **education** (обучение);

to form (придавать форму) – **formation** (формирование).

Exercise 2. Form the nouns using the suffix -ion (-tion, -ation). Translate them into Russian.

Model: to exhibit – exhibition

To connect, to limit, to consider, to invent, to express, to impress.

The Pronouns (Местоимения)

Личные местоимения		Притяжательные местоимения		Возвратные местоимения
Именительный падеж	Объектный падеж	Местоимения прилагательные	Абсолютная форма	
I	me	my	mine	myself
he	him	his	his	himself
she	her	her	hers	herself
it	it	its	its	itself
we	us	our	ours	ourselves
you	you	your	yours	yourself / yourselves
they	them	their	theirs	themselves

Exercise 3. Read the sentences with the correct pronoun.

1. Can you help *I/me* with this text? 2. We usually meet *they/them* at the sports-ground. 3. Who told *he/him* this news? 4. They asked *we/us* to come at 3 sharp. 5. I asked *she/her* to help me but *she/her* didn't agree. 6. Ann is leaving tonight. Would you go to see *she/her* off? 7. Those shoes are really nice. I'd like to buy *they/them*. 8. What is he talking about? We can't understand *he/him*. 9. I'm sorry for *she/her*. *She/hers* looks so tired.

Exercise 4. Put in a suitable pronoun.

1. She told me of a friend of (*she/her/hers*). 2. It seems to (*me/my/mine*) he is right. 3. They are highly qualified. It is difficult to choose between (*they/them/theirs*). 4. We were rather disappointed in (*him/he/his*). 5. Speak for yourself! It's not business of (*you/your/yours*). 6. The final decision is (*me/my/mine*). 7. I'm sure if I asked (*he/him/his*), he wouldn't object to help. 8. We went on holiday with some friends of (*our/ours*). 9. That's a good idea, but (*he/his/him*) is better. 10. Do you think that most people are happy in (*they/their/theirs*) jobs? 11. This is a new car of (*me/mine/he*).

Exercise 5. Put in a suitable reflexive pronoun.

1. She cut ... badly and had to go to hospital. 2. Tom, I think you'll enjoy ... at the party. 3. I think they are making fools of 4. He introduced ... to me. 5. She is quite capable, she can do it 6. When we are alone we talk to 7. I'm not angry with you. I'm angry with 8. I don't like people who think only about 9. Did you make it ...? 10. She will be very upset but I have to tell her the news

The Fractional Numerals (Дробные числительные)

1. В простых дробях числитель выражается *количественным* числительным, а знаменатель – *порядковым* числительным:

1/2 – a (one) half

1/3 – a (one) third

1/4 – a (one) quarter

Когда числитель больше единицы, знаменатель принимает окончание -s:

2/3 – two thirds

3/5 – three fifths

2. Существительное, следующее за дробью, стоит в единственном числе:

2/3 ton (читается: two thirds of a ton)

3/4 kilometre (читается: three quarters of a kilometre)

1/2 ton (читается: half a ton)

При этом следует обратить внимание на отсутствие артикля перед **half** и на отсутствие предлога **of** перед существительным.

3. Существительное, к которому относится смешанное число, употребляется во множественном числе:

2 1/2 tons (читается: two and a half tons или two tons and a half).

При чтении смешанного числа, целое число которого равно единице, существительное употребляется во множественном числе, когда оно читается после смешанного числа. Когда же существительное читается между единицей и дробью, оно употребляется в единственном числе:

1 1/2 hours (читается: one and a half hours или one (an) hour and a half).

4. В десятичных дробях целое число отделяется от дроби точкой (в русском – запятой). При чтении десятичных дробей каждая цифра читается отдельно. Точка, отделяющая целое число от дроби, читается **point**. Нуль читается **nought** [nɔ:t]. Если целое число равно нулю, то оно часто не читается:

0.25 – nought point two five или point two five

14.105 – one four (или fourteen) point one nought five.

Существительное, следующее за десятичной дробью, стоит в единственном числе, когда целое число равно **нулю**:

0.25 ton (читается: nought point two five **of a ton**).

В других случаях существительное стоит во множественном числе:

1.25 tons (читается: one point two five tons)

23.76 tons (читается: two three point seven six tons или twenty-three point seven six tons)

5. Проценты обозначаются следующим образом:

2 % или 2 per cent. или 2 p. c. (читается: two per cent)

Per cent (сокращенно p. c.), В английском языке cent не принимает окончания **-s**. Дробные доли одного процента обозначаются следующим образом:

3/8 % или 3/8 per cent или 3/8 p.c. (читается: three eighths per cent, или three eighths of one per cent.)

1/2 % или 1/2 per cent или 1/2 p.c. (читается: a half per cent, или a half of one per cent.)

0.2 % или 0.2 per cent или 0.2 p.c. (читается: nought point two per cent, или nought point two of one per cent).

Exercise 6. Read the following Fractional numbers.

$\frac{2}{3}$; $\frac{5}{16}$; $\frac{1}{4}$; $\frac{1}{10}$; $7\frac{1}{2}$; $2\frac{1}{4}$; 9.2416; 0.54; 0.2; 0.4; 0.02; 0.34; 1.8; 12.99; $\frac{31}{7}$; $8\frac{1}{2}$; $3\frac{1}{4}$; $\frac{4}{16}$; 4.254; 0.63; 2.5; 1.11; 12.842; 66.6; 999.209; $\frac{1}{8}$; $\frac{7}{8}$; $1\frac{1}{3}$; $9\frac{3}{4}$; $5\frac{1}{2}$.

Exercise 7. Read and memorize the following words and word combinations.

breakdown ['breɪkdaʊn] – разрушение, обрушение, авария

buildup ['bɪldʌp] – накопление, скопление

cement-sand mortar [sə'ment-sænd 'mɔ:tə] – цементно-песчаный рас-

твор

challenge ['ʃælɪndʒ] – сложная задача, проблема, трудность

collapse [kə'læps] – обрушение (*обычно сооружения*)

confined [kən'faɪnd] – замкнутый (*водоем*)

crack [kræk] – трещина

curing ['kjʊərɪŋ] – выдерживание бетона

curtail [kɜ:'teɪl] – предотвращать

cutoff ['kʌtɒf] – противοфильтрационная завеса

debris ['deɪbri:] – осколки, обломки

deterioration [dɪ'tɪərɪə'reɪʃən] – повреждение, износ

dissipating ['dɪsɪpeɪtɪŋ] – диссипирование, рассеивание

downstream [ˌdaʊn'stri:m] – нижний бьеф, русло нижнего бьефа

erode [ɪ'rəʊd] – разрушаться; подвергаться эрозии

erosion [ɪ'rəʊz(ə)n] – эрозия

foundation [faʊn'deɪʃ(ə)n] – фундамент, основание

gate [geɪt] – затвор (*гидротехнический*)

get jammed [getdʒæmd] – забивать(ся)

hole [həʊl] – дыра, отверстие

intake chamber ['ɪnteɪk 'ʃeɪmbə] – всасывающая камера

interactive action [ˌɪntər'æktɪv 'ækʃən] – динамическое (совместное)

действие

intersection [ˌɪntə'sekʃən] – пересечение

jamming ['dʒæmɪŋ] – заедание, заклинивание

leak [li:k] – пропускать жидкость, иметь течь

leakage ['li:kɪdʒ] – просачивание, протечка, течь

lined canal [laɪnd kə'næl] – канал с облицованными откосами

maintaining [meɪn'teɪnɪŋ] – эксплуатация, техническое обслуживание

obstruct [əb'strʌkt] – затруднять, препятствовать

opening ['əʊpənɪŋ] – щель, канава

overland flow ['əʊvəlænd fləʊ] – поверхностный (*склоновый*) сток

prone [prəʊn] – склонный, предрасположенный (*к чему-л.*)

remediate [rɪ'mi:diət] – устранять

sand trap [sændtræp] – пескоуловитель

sediment ['sedɪmənt] – осадочная порода, отложение

siltation [sɪl'teɪʃn] – заиление, отложение ила
 silting ['sɪltɪŋ] – облитерация (канала в гидросистеме)
 sluice gate [slu:s geɪt] – шлюзные ворота, водоспуск
 smooth operation [smu:ð, əp'reɪʃən] – бесперебойная работа
 smoothen ['smu:ðən] – разровнять, сгладить
 stilling basin [stɪlɪŋ 'beɪsn] – водобойный колодец, успокоительный бассейн
 structure ['strʌktʃə] – сооружение, строение
 transition point [træn'zɪʃən pɔɪnt] – точка перехода, переходный участок
 trowel ['traʊəl] – кельма, мастерок
 undermining ['ʌndə,maɪnɪŋ] – подмывание
 unlined canal [ʌn'laɪnd kə'næl] – необлицованный канал
 upstream water body [ʌp'stri:m 'wɔ:tə 'bɒdɪ] – водоём, расположенный выше по течению

water jet flow ['wɔ:tə dʒet fləʊ] – струйное течение воды

weir [wɪə] – полузапруда, водосливная или водоподъёмная плотина

Exercise 8. Read and translate the following text.

The importance of hydraulic structures cannot be overemphasized, and therefore their maintenance and safe utilization are critical. The structures should neither **leak** nor **erode**; channels and structures should be clean and free from **siltation** with noncorrosive or rotten moving parts. The **break-down** of these hydraulic structures can lead to a disastrous situation within the surrounding areas. For instance, a catastrophic dam **collapse** could lead to flooding and erosion. The **challenges** of **maintaining** hydraulic structures at the initial stage can be addressed by managing the characteristic of the flow to meet the desired goal of the project.

Erosion. Erosion is the washing away of the topmost soil layer by the agents of erosion, including water, wind, and human activities. Erosion by water is caused by **overland flow** and transport of **sediments** due to the **interactive action** of water flow and heavy rain droplets. In hydraulic structures, erosion can occur in canals, for example, in an **unlined canal** at **downstream** or **lined canal** section that receives **water jet flow** from a **gate** or pipe or water that spills over a **weir**. This type of erosion can be **remediated** by **dissipating** the energy of the incoming water through the construction of a **stilling basin**. Another critical point of canals that is **prone** to erosion is the **intersection** of a lined and unlined canal, that is, the **transition point** from a lined canal to the unlined canal. This type of problem is called **undermining** and, if not taken care of, can cause a collapse of

the lining and destruction of the **structure**. Undermining can be avoided or controlled by the provision of **cutoff** that will protect the **foundation** of the structure.

Leakage. **Leakage** in hydraulic structures refers to the ability of **confined** or **upstream water bodies** to exploit the least available exit, space, or crack underneath or along the structure to escape to the downstream. The moment the water found these small spaces, there is a leakage problem, which is the beginning of erosion. These small **openings** and **cracks** are widened with time. Thus, the soil is washed away as time goes on and the structure will collapse. Leakages in the crack can be repaired by cleaning the wall or the floor where the crack is located. Then remove any sand, clay, plant growth or **debris**. Prepare **cement-sand mortar** to fill the **hole** and **smoothen** it with a **trowel**. Provide adequate **curing** to the repaired crack.

Siltation. Siltation is the process of deposition of debris and sand particles and their **buildup** in hydraulic structures that **obstruct** the full functioning of the structures. The problems caused by siltation are usually the changes in water flow, changes in velocities and water levels, decreased energy dissipation, and so on. Examples of these problems include deposition of large volumes of sand in the **intake chamber** of pumps, which usually causes damage to the pumps and subsequent **silting** of the canals by sand particles. Another instance is siltation at the stilling basin. This type of sand deposits reduces the energy dissipation of the structure. Because of these problems, large **sand traps** are usually constructed at the end of the upper main canal to collect the sand deposits and remove them by periodic cleaning.

Corrosion/rot. Hydraulic structures are made from different materials, including concrete, wood, or steel. These structures are liable to **deterioration** with time and with alternating wet and dry conditions subjected. The wooden parts in the structure, for instance, rot and decompose, whereas the steel parts corrode, as a rule, causing their expansion, and **get jammed**. Such a condition affects the **smooth operation** of the structures. Routine maintenance is necessary to **curtail** the problems and reduce their effects. Painting of the affected parts can preserve them against corrosion. Lubrication of moving parts (steel) such as **sluice gates** and valves can prevent **jamming**.

Exercise 9. Translate the following words and word combinations into Russian.

Safe utilization; erode; disastrous situation; siltation; challenges; overland flow; sediments; interactive action of water flow; unlined canal at

downstream; lined canal section; weir; stilling basin; transition point; leakage; debris; cement-sand mortar; changes in velocities and water levels; liable to deterioration; intake chamber of pumps; energy dissipation; rot and decompose; curtail the problems; sluice gates and valves; jamming.

Exercise 10. Read the text and insert the necessary prepositions.

1. The breakdown ... these hydraulic structures can lead ... a disastrous situation ... the surrounding areas. 2. Erosion is the washing away ... the topmost soil layer ... the agents ... erosion. 3. Provide adequate curing ... the repaired crack. 4. This type ... sand deposits reduces the energy dissipation ... the structure. 5. Painting ... the affected parts can preserve them ... corrosion. 6. Hydraulic structures are made ... different materials. 7. These small openings and cracks are widened ... time.

Exercise 11. Translate the expressions into Russian paying attention to the prepositions.

The importance *of* hydraulic structures; structures should be free *from* siltation; dam collapse can lead *to* flooding; goal *of* the project; *due to* the interactive action; water spills *over* a weir; transition point *from* a canal; leakage *in* hydraulic structure; cracks are widened *with* time; problems caused *by* siltation; liable *to* deterioration; preserve *against* corrosion.

Exercise 12. Find in group B the English equivalents to the Russian words in group A.

A	B
1. использование	a) situation; b) utilization; c) deterioration.
2. самый верхний	a) upper; b) heavy; c) topmost.
3. обрушение	a) downstream; b) section; c) collapse.
4. обеспечение	a) intersection; b) provision; c) siltation.
5. просачивание	a) maintenance; b) deposition; c) leakage.
6. диссипирование	a) expansion; b) dissipating; c) condition.
7. чередование	a) corrosion; b) cleaning; c) alternating.
8. последующий	a) managing; b) available; c) subsequent.
9. нержавеющий	a) noncorrosive; b) characteristic; c) small.

Exercise 13. Translate the following words and word combinations into English.

Техническое обслуживание; струйное течение воды; бедственное положение; заилиение; трудности эксплуатации; подмывание; водоём, расположенный выше по течению; разрушение сооружения; щели и трещины; песок, глина, растительность; основание сооружения; процесс отложения осколков; изменения в течении воды; рассеивание энергии; верхний магистральный канал; влажные и сухие условия.

Exercise 14. Answer the following questions.

1. In what condition should the hydraulic structures remain? 2. What does a catastrophic dam collapse could lead to? 3. What is erosion by water caused by? 4. What type of problem is called *undermining*? 5. What does leakage in hydraulic structures refer to? 6. How can leakage in the crack be repaired by? 7. What are the problems caused by siltation? 8. What does siltation reduce at the stilling basin? 9. Can routine maintenance ensure smooth operation of the hydraulic structures?

UNIT 5

Dams

Part I

Словообразование

Суффикс **-ist**, прибавляемый к существительному, обозначает последователя определенного учения, теории или специалиста в какой-либо области:

Michurin – Michurin**ist** (мичуринец);

agronomy (агрономия) – agronom**ist** (агроном).

Exercise 1. Form the nouns using the suffix -ist. Translate them into Russian.

Model: psychology – psychologist

Biology, psychiatry, mineralogy, Latin, science, colony, optimism.

Суффикс **-ism**, прибавляемый к существительному или прилагательному, обозначает учение, качество или особенность речи:

modern (современный) – modern**ism** (модернизм);

hero (герой) – hero**ism** (героизм);

American (американский) – American**ism** (американизм).

Exercise 2. Form the nouns using the suffix -ism. Translate them into Russian.

Model: individual – individualism

Classic, Calvin, Darwin, material, ideal, professional, capital, feudal.

The Article (Артикль)

Артикль – это служебное слово, являющееся одним из основных формальных признаков существительного. В английском языке есть два артикля – неопределенный и определенный.

1. Неопределенный артикль имеет две формы: a и an.

Форма *a* употребляется перед словами, которые начинаются с согласного звука: *a man, a table*. Форма *an* употребляется перед словами, которые начинаются с гласного звука: *an answer, an old man*.

2. Определенный артикль имеет одну графическую форму the.

Определенный артикль происходит от указательного местоимения *that* – *том* и употребляется перед существительными в единственном и множественном числе.

The Indefinite Article **(Неопределенный артикль)**

1) неопределенный артикль употребляется:

1. Для обозначения принадлежности предмета к какому-либо классу предметов (со значением <i>какой-то, один из, любой</i>).	I am a student. I've read an interesting book.
2. В значении <i>один</i> перед исчисляемыми существительными, обозначающими <i>время, вес, стоимость, расстояние</i> .	once a week, twice a month, in an hour, two pounds a kilo, 70 km. an hour
3. С исчисляемыми существительными, упоминаемыми впервые.	I've bought a coat. The coat is not very expensive.
4. С числительными: a dozen, a hundred, a thousand, a million – в значении один.	If she had a million pounds, she wouldn't work.

The Definite Article **(Определенный артикль)**

2) определенный артикль употребляется:

1. Перед существительным, обозначающим конкретный предмет, о котором даются или выясняются дополнительные сведения; с существительными, упоминаемыми раньше.	The village is not far from the city. I've bought a flat. The flat is very cozy.
2. Перед существительным, обозначающим вещество в определенном количестве или в определенном месте в данной обстановке во время общения.	Pass me the salt, please! Where is the sugar?
3. Перед существительным, являющимся единственным в своем роде или данной обстановке, а также: the sky, the ground, the country, the environment, the world, the cinema, the theater, the radio (but: television), the government, the weather.	The earth, the moon, the sun, the universe, the equator, the horizon, the atmosphere, the kosmos, the Milky Way. Open the door, please.

4. Перед существительным, имеющим определение, выраженное прилагательным в превосходной степени.	This is the most interesting book I've got.
5. Перед существительными, обозначающими социальные классы людей.	the workers the bourgeoisie
6. Перед существительными в единственном числе, обозначающими целый класс предметов.	The dog is a friend of man. The rose is my favorite flower.
7. Перед существительными: the police, the army, the fire brigade, the bank, the post office, the doctor, the press, the telegraph.	The police are looking for the thief. I am not well. I am going to the doctor.
8. С датами (в устной речи).	On the first of May.
9. Перед названиями организаций, документов, официальных титулов, политических партий, этнических групп, открытий, музыкальных инструментов, танцев.	The Constitution, the United Nations, the Pentagon, the President, the Conservative Party, the Indians, the telephone, the piano, the waltz.

3) перед именами собственными

1. Перед именем собственным, обозначающим всю семью.	The Smiths, the Browns.
2. Перед названием стран, которые включают слова republic, union, kingdom, state, а также употребленными во множественном числе, с названием некоторых местностей, исторических событий, эпох.	The USA, the Republic of Belarus, the United Kingdom, The Netherlands, the French Revolution, the Ice Age.
3. Перед названиями океанов, морей, рек, горных цепей, пустынь, каналов, групп островов.	The Atlantic Ocean, the Black Sea, the Thames, the British Isles, the Ontario (but Lake Ontario), the Alps, the Sahara, the Sues Canal.
4. Перед названиями четырех сторон света.	The North, the South, the East, the West.
5. Перед названиями гостиниц, театров, кинотеатров, музеев и галерей, ресторанов и баров, кораблей и английских газет, а также перед названиями с предлогом of.	The Hilton Hotel, the Odeon, The Tate Gallery, the Times, the Queen Elizabeth (корабль), the Titanic, the University of London.

The Zero Article (Нулевой артикль в английском языке)

4) нулевой артикль употребляется:

1. Перед абстрактными существительными; перед названием вещества, если речь не идет о конкретном количестве.	Life is not interesting without love and care. – Tea or coffee? – Tea, please.
2. Перед существительными во множественном числе в общем смысле	Children like ice-cream.

3. Перед именами собственными, с названиями городов, улиц, площадей, парков, вокзалов, аэропортов, мостов, горных вершин, отдельных островов, планет, праздников и видов спорта. Перед названиями университетов, имеющих имя собственное.	Alex, London, Trafalgar square, Downing street, Buckingham Palace, Westminster Abbey, Eiffel Tower, Venus, Victory Day, Elbrus, Madagascar, Hyde Park, Tower Bridge, football. Oxford University, London University
4. С названиями стран, континентов, официальными званиями с именами собственными	Russia, South America, Asia, Queen Elizabeth.
5. Перед названиями наук.	Economics, History.
6. Перед существительными, определяемыми притяжательными (my, his, her, its, our, your, their), указательными (this, that, these, those), вопросительными (what, which, whose) и неопределенными (some, any, each, every, much, many и so) местоимениями.	There is no theater in our town. Take any book you like.
7. Перед названиями магазинов, банков, отелей с именами их основателей (часто в притяжательном падеже)	Barclays Bank, Harrods, McDonald's.

Exercise 3. Fill in the blanks with *a* or *an*.

1. That flower is ... rose. 2. This is ... English class. 3. I spent ... hour and ... half to fulfill my homework. 4. It takes me half ... hour to get to the station. 5. A football match is ... interesting thing. 6. That is ... hotel. 7. ... apple is ... fruit. 8. This is ... historical monument. 9. My mother has ... headache. 10. ... hotel room in New York is very expensive.

Exercise 4. Supply *the*, *a/an* or *no article*.

1. I come to ... work by ... bus. Today ... bus was late. 2. ... Jack is ... youngest but ... cleverest boy at ... school. 3. It rained, so I stayed at ... home in ... evening. But today ... sun is shining brightly in ... sky. 4. On ... Monday ... kids were tired and they went to ... bed very early. 5. My wife is ... best woman in ... world and I'm ... happiest husband! 6. They are having ... test on ... third of December. 7. What ... beautiful painting! ... artist is such ... talented person. 8. Robin Hood robbed ... rich and helped ... poor. 9. David is ... old friend of mine. He plays ... guitar perfectly. His sister has been playing ... tennis since ... age of ten. 10. ... Jacksons live in that lovely cottage with ... fantastic garden.

Exercise 5. Supply *the*, *a/an* or *no article*.

1. ... Cairo is ... capital of ... Egypt. 2. It was so picturesque in ... Crimea ... last summer. 3. ... London stands on ... River Thames. 4. I had ... my holiday in ... northern Italy ... last year but I'm going to cross ... Atlan-

tic Ocean and visit ... USA ... next year. 5. ... Moon moves round ... Earth. 6. ... Great Patriotic war started in 1941. 7. ... Volga is ... longest river in ... Russia. 8. ... Ukraine and ... Turkey are separated by ... Black sea. 9. My friend usually goes to ... Alps in ... spring by ... plane. 10. ... Urals are lower than ... Caucasus. 11. ... Great Britain is situated on ... two large islands. 12. ... Christmas and ... Easter are my favourite holidays.

Exercise 6. Read and memorize the following words and word combinations.

bedrock ['bedrɒk] – коренная подстилающая порода
 carrying capacity ['kærɪŋkə pæsəti] – пропускная способность
 cofferdam ['kɒfədæm] – водонепроницаемая крепь, перемычка
 conduit ['kɒnd(j)uɪt] – водоотводная канава
 conveyance system [kən'veiəns 'sɪstəm] – система транспортирования
 debris dam ['deɪbriː dæm] – наносозадерживающая плотина
 detention dam [dɪ'tenʃən dæm] – водозадерживающая плотина с регулируемым водосбором
 diversion dam [daɪ'vɜːʃən dæm] – водозаборная плотина, водоподъёмная плотина
 drift wood [drɪft wud] – сплавной лес
 enclosure [ɪn'kləʊʒə] – огораживание, отгораживание
 gorge [ɡɔːdʒ] – ущелье, теснина
 gravel ['grævəl] – гравий; галька, галечник
 gravity dam ['grævɪtɪ dæm] – гравитационная плотина, массивная плотина (*с обеспечением устойчивости действием собственного веса*)
 hydroelectric power generation [ˌhaɪdrəʊ'lektrɪk 'paʊə ˌdʒenə'reɪʃən] – производство гидроэлектроэнергии
 impervious [ɪm'pɜːviəs] – непроницаемый, не пропускающий (*влагу, воздух*)
 impound [ɪm'paʊnd] – запруживать (*воду*)
 multipurpose dam [ˌmʌltɪ'pɜːpəs dæm] – многоцелевая плотина
 off-taking canal [ɔf 'teɪkɪŋ kə'næl] – водоотводный канал
 reservoir ['rezəvwaː] – водохранилище
 single-purpose dam [sɪŋɡəl'pɜːpəs dæm] – плотина специального назначения
 spring runoff [sprɪŋ 'rʌnɒf] – весенний сток
 stone masonry [stəʊn 'meɪsnrɪ] – каменная кладка
 storage dam ['stɔːrɪdʒ dæm] – водохранилища плотина
 thrust [θrʌst] – горизонтальное или боковое давление, надвиг
 topple over ['tɒpl əʊvə] – опрокидывать(ся), переворачивать(ся)

Exercise 7. Read and translate the following text.

A dam is a hydraulic structure of **impervious** material built across a river to create a **reservoir** on its upstream side for **impounding** water for various purposes. These purposes may be irrigation, hydropower, water-supply, flood control, navigation, fishing and recreation. Dams may be built to meet the one of the above purposes or they may be constructed to fulfill more than one. As such, dam can be classified as: **single-purpose and multipurpose dam**. Dams can be classified in a number of ways. But most usual ways of classification of dams are mentioned below:

Storage dams. They are constructed to store water during the rainy season when there is a large flow in the river. Many small dams impound the **spring runoff** for later use in dry summers. Storage dams may also provide a water supply, or improved habitat for fish and wildlife. They may store water for **hydroelectric power generation**, irrigation or for a flood control project. Storage dams are the most common type of dams worldwide.

Diversion dams. A **diversion dam** is constructed for the purpose of diverting water from the river into an **off-taking canal** (or a **conduit**). They provide sufficient pressure for pushing water into ditches, canals, or other **conveyance systems**. Such shorter dams are used for irrigation, and for diversion from a stream to a distant storage reservoir. A diversion dam is usually of low height and has a small storage reservoir on its upstream. The diversion dam is a sort of storage weir which also diverts water and has a small storage. Sometimes, the terms weirs and diversion dams are used synonymously.

Detention dams. **Detention dams** are constructed for flood control. A detention dam retards the flow in the river on its downstream during floods by storing some flood water. Thus the effect of sudden floods is reduced to some extent. The water retained in the reservoir is later released gradually at a controlled rate according to the **carrying capacity** of the channel downstream of the detention dam. Thus the area downstream of the dam is protected against flood.

Debris dams. A **debris dam** is constructed to retain debris such as sand, **gravel**, and **drift wood** flowing in the river with water. The water after passing over a debris dam is relatively clear.

Coffer dams. It is an **enclosure** constructed around the construction site to exclude water so that the construction can be done in dry. A coffer dam is thus a temporary dam constructed for facilitating construction. A coffer dam is usually constructed on the upstream of the main dam to divert water into a diversion tunnel (or channel) during the construction of the dam.

When the flow in the river during construction of the dam is not much, the site is usually enclosed by the coffer dam and pumped dry. Sometimes a coffer dam on the downstream of the dam is also required.

Gravity Dams. A **gravity dam** is a massive sized dam fabricated from concrete or **stone masonry**. They are designed to hold back large volumes of water. By using concrete, the weight of the dam is actually able to resist the horizontal **thrust** of water pushing against it. This is why it is called a gravity dam. Gravity essentially holds the dam down to the ground, stopping water from **toppling it over**. Gravity dams are well suited for blocking rivers in wide valleys or narrow **gorge** ways. Since gravity dams must rely on their own weight to hold back water, it is necessary that they are built on a solid foundation of **bedrock**.

Exercise 8. Say whether the following statements are true or false. Correct the false ones using the text.

1. A dam is a hydraulic structure that serves only for irrigation. 2. Storage dams provide a water supply for fish and wildlife. 3. A diversion dam has a large storage reservoir on its upstream. 4. Detention dam retards the flow in the river by storing some flood water. 5. A coffer dam is built to divert water to irrigate the nearby fields. 6. A gravity dam is actually able to resist the horizontal thrust of water.

Exercise 9. Match the words with their definitions.

- | | |
|---------------|---|
| 1. recreation | a) a large natural stream of flowing water |
| 2. dam | b) activity done for enjoyment |
| 3. runoff | c) a deep, narrow valley |
| 4. river | d) a barrier constructed to hold back water |
| 5. reservoir | e) a channel for conveying water or other fluid |
| 6. flood | f) rainwater that forms a stream |
| 7. gorge | g) an overflow of a large amount of water |
| 8. conduit | h) a lake that is used for storing water |
| 9. gravity | i) solid rock underlying loose deposits |
| 10. bedrock | j) the force which causes things to drop |

Exercise 10. Translate the following words and word combinations into Russian.

Impervious material; single-purpose dam; store water; dry summer; provide a water supply; hydroelectric power generation; irrigation; flood control project; common type of dams; diversion dam; storage dam; off-taking canal; provide sufficient pressure; distant storage reservoir; upstream; solid foundation; detention dam; effect of sudden floods; retain debris; coffer dam; construction of the dam; gravity dam; concrete; stone masonry.

Exercise 11. Translate the following words and word combinations into English.

Сторона, расположенная выше по течению; орошение; гидроэнергетика; водоснабжение; борьба с наводнениями; судоходство; многоцелевая плотина; дождливый сезон; весенний сток; водозаборная плотина; канавы; каналы; система транспортирования; водозадерживающая плотина с регулируемым водосбором; наносозадерживающая плотина; песок; гравий; временная плотина; гравитационная плотина.

Exercise 12. Choose the correct preposition.

1. Dams can be classified *in/for* a number *of/to* ways. 2. Storage dams are the most common type *of/in* dams worldwide. 3. Detention dams are constructed *for/without* flood control. 4. Thus the area downstream *of/to* the dam is protected *at/against* flood. 5. Sometimes a coffer dam *in/on* the downstream *to/of* the dam is also required. 6. Gravity dams are well suited *for/from* blocking rivers *in/at* wide valleys or narrow gorge ways.

UNIT 6

Dams

Part II

Словообразование

Суффикс **-ly**, прибавляемый к прилагательному, образует наречие: happy (счастливый) – happily (счастливо).

Суффикс **-ly**, прибавляемый к существительному, образует прилагательное, указывающее на определенное качество или повторяемость: friend (друг) – friendly (дружелюбный);

Exercise 1. Form the adverbs using the suffix -ly. Translate them into Russian.

Model: practical – practically

Soft, ready, attentive, weak, strong, comfortable, regular.

Model: king – kingly

Sloven, time, world, god, heaven, brother, day, week, year.

Суффикс **-ward**, прибавляемый к существительному и наречию, образует наречие со значением «в направлении»:

north (север) – north**ward** (на север).

Exercise 2. Form the adverbs using the suffix *-ward*. Translate them into Russian.

Model: west – westward

Earth, home, sky, wind, east, sea, south, in, up, down, back, out.

The Verb *To Be* in the Present Indefinite
(Глагол *to be* в настоящем неопределенном времени)

Глагол **to be** может употребляться:

1) как *глагол-связка*:

Mike *is* a driver. – Майк водитель.

Ted and John *are* English. – Тед и Джон англичане.

It *is* a big house. – Это большой дом.

The floor *is* brown. – Пол коричневый;

2) как смысловой глагол, обозначающий *местонахождение*, например:

The fountain *is* in the park. – Фонтан *находится* в парке.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I am	I am not	Am I?
He is	He is not	Is he?
She is	She is not	Is she?
It is	It is not	Is it?
We are	We are not	Are we?
You are	You are not	Are you?
They are	They are not	Are they?

Exercise 3. Translate the following sentences into Russian.

1. My brother is from Finland. 2. Their toys are not in the box. 3. Is her friend a driver? 4. Your dog is in the yard now. 5. Her sisters are not seven. 6. Are their books in the bookcase? 7. How old are your friends? 8. Is her grandmother from Mexico or Canada? 9. Their grandfather is not from Polotsk. 10. What is this young man? 11. His parents are pensioners, aren't they? 12. Our mother is not thirty, is she? 13. He is from Wales.

Exercise 4. Use *to be* in the Present Indefinite.

1. What ... your name? – My name ... Ann. 2. What ... your address? – My address ... 175 Central Way. 3. What ... your phone number? – My phone number ... 718-19-30. 4. Where ... you from? – I ... from Greater London. 5. What ... you? – I ... a student. 6. Who ... your parents? – My parents ... Steve and Nancy. 7. What ... they? – They ... teachers.

8. What ... your uncle? – My uncle ... a doctor. 9. ... your aunt a doctor? – No, she ... not. She ... a housewife. 10. ... they at home? – No, they ... not at home, they ... at work. 11. My brother ... a driver. He ... at work too. 12. ... your family big? – Yes, it 13. ... your sister tall? – No, she ... not. She ... a little girl. She ... five years old.

The Present Indefinite Active (Настоящее неопределенное время в активном залоге)

Утвердительная форма	Отрицательная форма	Вопросительная форма
I work	I do not work	Do I work?
We work	We do not work	Do we work?
You work	You do not work	Do you work?
They work	They do not work	Do they work?
He works	He does not work	Does he work?
She works	She does not work	Does she work?
It works	It does not work	Does it work?

Настоящее неопределенное время в активном залоге (The Present Indefinite Active) употребляется:

1) для выражения обычного повторяющегося действия с такими обстоятельствами времени, как: **never** – никогда, **regularly** – регулярно, **usually** – обычно, **always** – всегда, **daily** – ежедневно, **often** – часто, **seldom** – редко, **sometimes** – иногда, **every day (week, month)** – каждый день (неделю, месяц):

We drink coffee every morning. – Мы пьем кофе каждое утро;

2) для передачи общеизвестных фактов, простых истин, действий и состояний:

The Earth goes round the Sun. – Земля *вращается* вокруг солнца;

3) для выражения ряда последовательных действий в настоящем:

I get up at seven, do morning exercises, and then I have breakfast. – Я *встаю* в семь, *делаю* утреннюю зарядку, а затем *завтракаю*.

В 3-м лице единственного числа форма **Present Indefinite Active** образуется прибавлением к основе глагола окончания **-s** или **-es**:

1) если глагол заканчивается на **-o**, **-ss**, **-sh**, **-ch**, **-x**, в 3-м лице единственного числа к нему прибавляется **-es**: *do – does*, *fix – fixes*, *watch – watches*, *wash – washes*;

2) в глаголах, оканчивающихся на букву **-y** с предшествующей согласной, **y** переходит в **i** и прибавляется **-es**: *copy – copies*.

В глаголах, оканчивающихся на букву **-y** с предшествующей гласной, **y** не изменяется: *play – plays*.

Exercise 5. Translate the following sentences into Russian.

1. My dog Rex often barks. 2. The child prefers to play an interesting game. 3. My friend Peter always tells the truth. 4. We do not go to school on Saturdays. 5. Does Sue take a shower two times a day? 6. I have five delicious apples. 7. Kate does not like to play the guitar. 8. My working day usually begins at eight o'clock. 9. Diana never eats meat. 10. Where do you work? 11. Does your brother read a lot? 12. Successful students always do homework. 13. When does our uncle get up?

Exercise 6. Put the verbs in brackets in the Present Indefinite.

1. Children (ask) a lot of questions. 2. They usually (drink) coffee after their evening meal. 3. You always (forget) my birthday. 4. She never (listen) to me. 5. I (love) classical music. 6. She (drive) to work when the weather's cold. 7. Nick (understand) Arabic very well. 8. Tom (learn) two languages at school. 9. My sister (watch) TV most evenings. 10. Lessons (start) at 8:30 every morning. 11. Victor and Sam (come) from school at 5 every day. 12. Our friend (not, like) to listen to pop-music. 13. I (not, go) to the cinema very often. 14. You (drink) coffee in the morning?

The Modal Verb *Must* (Модальный глагол *must*)

Модальный глагол **must** – *должен, нужно, надо* – имеет только одну форму. Действие, выраженное инфинитивом в сочетании с **must**, может относиться к *настоящему* и *будущему* времени.

I We You They He / She It	must (must not)	come to the office. prepare the report by Friday.
Must	I we you they he / she it	start working at 7:00? open the window?

Модальный глагол **must** в утвердительной форме имеет следующие значения:

1) *обязанность, приказ* – в этом значении он переводится на русский язык *должен, обязан*:

I *must go* to work at 8 o'clock. – Я *должен* уходить на работу в восемь часов (*обязанность*).

You *must do* as I tell you! – Ты *должен* делать то, что я тебе говорю! (*приказ*);

2) настоятельный *совет* или *приглашение* – в этом значении он переводится на русский язык (*обязательно*) *должен, (обязательно) нужно*:

You *must consult* a doctor. – Ты *должен* обратиться к врачу (*совет*).

You *must come* and see us next week! – Вы *должны* навестить нас на следующей неделе! (*приглашение*).

3) в вопросительном предложении глагол **must** имеет значение *обязательно ли должен*, поскольку вопрос выражает нежелание выполнить данное действие:

Must I do it now? – Я *должен* сделать это сейчас?

4) категорический запрет в значении *запрещается, не должен*:

You *must not smoke* here! – Тебе нельзя курить здесь! (*запрет*).

5) уверенное предположение, которое говорящий считает правдоподобным со значением *должно быть*:

Sandy *must remember* my address. Должно быть, Санди помнит мой адрес (*предположение*).

Exercise 7. Translate the following sentences into Russian.

1. You mustn't make a noise, when the child is asleep. 2. Must I attend classes every day? 3. Must we finish our work tomorrow? 4. The room is very dirty. I must clean it. 5. All passengers must pay for a ticket. 6. You mustn't speak loud in the library. 7. You mustn't disturb your grandmother. She is ill. 8. You mustn't talk at the lesson, must you? 9. People must take care of nature. 10. You must come and see us. 11. You mustn't speak to me like this. 12. They must know his address. 13. We mustn't be late.

Exercise 8. Read and memorize the following words and word combinations.

abutment [ə'batmənt] – опора, пята (*арки*)

ample spillway ['æmpl 'spɪlweɪ] – широкий водосброс

angle of repose ['æŋgl əv rɪ'pəʊz] – угол естественного откоса

arch action [ɑ:ʃ 'ækʃən] – распор; арочное действие

arch dam [ɑ:ʃ 'dæm] – арочная плотина

asphaltic concrete ['æs'fæltɪk 'kɒŋkri:t] – асфальтобетон

boulder ['bəʊldə] – валун, булыжный камень

buttress ['bʌtrɪs] – контрфорс

buttress dam ['bʌtrɪs dæm] – контрфорсная плотина
 cement concrete [sə'ment 'kɒŋkri:t] – цементобетон
 convexity [kɒn'veksəti] – выпуклость
 core [kɔ:] – ядро, сердцевина
 crushed stone [krʌʃt stəʊn] – щебень, бутовый камень
 curvature ['kɜ:vəʃə] – изгиб, искривление, кривизна
 curved ['kɜ:vɪd] – изогнутый
 deck slab [dek slæb] – плита напорного перекрытия
 deck slab buttress dam [dek slæb 'bʌtrɪs dæm] – контрфорсная плотина
 со плитой перекрытия
 downstream side [ˌdaʊn'stri:m saɪd] – низовая сторона плотины
 dumped rockfill [dʌmpt 'rɒkfi:l] – отсыпанная каменная наброска
 earth dam [ɜ:θ dæm] – земляная плотина
 edge [edʒ] – край, кромка
 facing ['feɪsɪŋ] – облицовка
 flanks [flæŋks] – полудужья (*арки*)
 flare [fleə] – расширять(ся), расходиться раструбом
 head [hed] – выступ; внешняя или выступающая часть сооружения
 hollow-buttress dam ['hɒləʊ 'bʌtrɪs dæm] – плотина с полыми контрфорсами
 impervious [ɪm'pɜ:viəs] – непроницаемый
 massive head buttress dam ['mæsɪv hed 'bʌtrɪs dæm] – массивно-контрфорсная плотина
 multiple arch buttress dam ['mʌltɪpl ɑ:ʃ bʌtrɪs dæm] – многоарочная контрфорсная плотина
 overtop [ˌəʊvə'tɒp] – переливаться
 permeable ['pɜ:miəbl] – водопроницаемый
 piping ['paɪpɪŋ] – движение материала (*грунта в плотине*), увлечённого фильтрующей водой
 reinforced concrete slab [ˌri:m'fɔ:st 'kɒŋkri:t slæb] – железобетонная панель; железобетонная плита
 rock fragment [rɒk 'frægmənt] – обломок горной породы
 rockfill ['rɒkfi:l] – насыпь из каменной наброски
 rockfill dam ['rɒkfi:l dæm] – каменнонабросная плотина
 rubble cushion ['rʌbl 'kʊʃən] – щебеночная подушка
 seepage ['si:piʒ] – утечка; потери воды при инфильтрации в почву (*из каналов, резервуаров и т. д.*)
 shear strength of soil [ʃiə streŋθ əv sɔɪl] – прочность грунта на сдвиг
 sloping deck slab ['sləʊpɪŋ dek slæb] – наклонная плита напорного перекрытия (*контрфорсной плотины*)

span [spæn] – перекрывать расстояние между опорами (*арки*)
timber membrane ['tɪmbə 'membrem] – деревянная диафрагма
thrust [θrʌst] – горизонтальное или боковое давление, надвиг
upstream [ʌp'stri:m] – верхний бьеф, верховая сторона плотины
upstream side [ʌp'stri:m saɪd] – напорная сторона (*плотины*)
washout ['wɒʃaut] – вымывание, размыв, смыв

Exercise 9. Read and translate the following text.

Earth dams. An **earth dam** is made of earth (or soil) built up by compacting successive layers of earth, using the most **impervious** materials to form a **core** and placing more permeable substances on the **upstream** and **downstream sides**. A **facing** of **crushed stone** prevents erosion by wind or rain, and an **ample spillway**, usually of concrete, protects against catastrophic **washout** should the water **overtop** the dam. Earth dam resists the forces exerting upon it mainly due to **shear strength of the soil**.

Rockfill dams. A **rockfill dam** is built of **rock fragments** and **boulders** of large size. An impervious membrane is placed on the **rockfill** on the upstream side to reduce the **seepage** through the dam. The membrane is usually made of **cement concrete** or **asphaltic concrete**. In early rockfill dams, steel and **timber membrane** were also used, but now they are obsolete.

A dry **rubble cushion** is placed between the rockfill and the membrane for the distribution of water load and for providing a support to the membrane. Sometimes, the rockfill dams have an impervious earth core in the middle to check the seepage instead of an impervious **upstream** membrane. The earth core is placed against a **dumped rockfill**. It is necessary to provide adequate filters between the earth core and the rockfill on the upstream and downstream sides of the core so that the soil particles are not carried by water and **pipng** does not occur. The side slopes of rockfill are usually kept equal to the **angle of repose** of rock, which is usually taken as 1.4:1 (or 1.3:1). Rockfill dams require foundation stronger than those for earth dams.

Arch dams. An **arch dam** is curved in plan, with its **convexity** towards the upstream side. An arch dam transfers the water pressure and other forces mainly to the **abutments** by arch action. An arch dam is quite suitable for narrow canyons with strong **flanks** which are capable of resisting the **thrust** produced by the **arch action**. The section of an arch dam is approximately triangular like a gravity dam but the section is comparatively thinner. The arch dam may have a single **curvature** or double curvature in the vertical plane. Generally, the arch dams of double curvature are more economical and are used in practice.

Buttress dams. **Buttress dams** are of three types: 1) deck slab buttress dam, 2) multiple arch buttress dam, and 3) massive head buttress dam. A deck slab buttress dam consists of a **sloping deck slab** supported by buttresses. Buttresses are triangular concrete walls which transmit the water pressure from the deck slab to the foundation. Their upstream side is not vertical but inclines about 25° to 45° , so the thrust of the water on the upstream face inclines toward the foundation. Buttresses are spaced across the dam site every 6 to 30 metres, depending upon the size and design of the dam. Buttress dams are sometimes called **hollow-buttress dams** because the buttresses do not form a solid wall stretching across a river valley. The deck slab is usually a **reinforced concrete slab** supported between the buttresses, which are usually equally spaced.

In a multiple arch buttress dam the deck slab is replaced by horizontal arches supported by buttresses. The arches are usually of small **span** and made of concrete. In a massive head buttress dam, there is no deck slab. Instead of the deck, the upstream **edges** of the buttresses are **flared** to form massive **heads** which span the distance between the buttresses. The buttress dams require less concrete than gravity dams. But they are not necessarily cheaper than the gravity dams because of extra cost of form work, reinforcement and more skilled labor. The foundation requirements of a buttress dam are usually less stringent than those in a gravity dam.

Exercise 10. Translate the words and word combination in brackets into English using the text.

1. Earth dam resists the (силам, воздействующим на) it mainly due to (прочности грунта на сдвиг).

2. In early (каменнонабросные плотины), steel and timber membrane were also used, but now they are (устарелый).

3. An (арочная плотина) is curved in plan, with its convexity towards the (напорная сторона).

4. (Контрфорсы) are spaced across the dam site (с интервалом от 6 до 30 метров), depending upon the (размер и конструкция) of the dam.

Exercise 11. Translate the following words and word combinations into English using the text.

Уплотнение последовательных слоев грунта; водонепроницаемый материал; щебень; цементобетон; широкий водосброс; асфальтобетон; щебеночная подушка; распределение водной нагрузки; ядро из водонепроницаемого грунта; отсыпанная каменная наброска; опора (*арки*); прочные полудужья; арочное действие; массивно-контрфорсная плотина; треугольные бетонные стены; железобетонная панель; плита напорного перекрытия; расстояние между контрфорсами.

Exercise 12. Make up word combinations using the text and translate them.

- | | |
|-----------------|--------------|
| 1. catastrophic | a) side |
| 2. downstream | b) membrane |
| 3. impervious | c) dams |
| 4. earth | d) canyons |
| 5. soil | e) site |
| 6. narrow | f) core |
| 7. dam | g) curvature |
| 8. gravity | h) washout |
| 9. single | i) particles |

Exercise 13. Read the text and insert the necessary propositions.

1) an earth dam is made ... earth; 2) a facing ... crushed stone; 3) a impervious membrane is placed ... the rockfill; 4) to reduce the seepage ... the dam; 5) rubble cushion is placed ... the rockfill and the membrane; 6) section ... an arch dam; 7) transmit the water pressure ... the deck slab ... the foundation; 8) a solid wall stretching ... a river valley; 9) horizontal arches supported ... buttresses; 10) extra cost ... form work.

Exercise 14. Translate the following words and word combinations into Russian.

Erosion by wind or rain; rock fragments and boulders; reduce the seepage; cement concrete; piping; support to the membrane; impervious upstream membrane; adequate filters; water pressure; foundation; curvature; vertical plane; sloping deck slab; hollow-buttress dams; across a river valley; reinforced concrete slab; thrust of the water; horizontal arches; upstream edges; massive heads; skilled labor; foundation requirements.

Exercise 15. Answer the following questions.

1. How is an earth dam built up? 2. Does a facing of crushed stone or of concrete prevents possible catastrophic washout? 3. Where is an impervious membrane placed when building a rockfill dam? 4. What do the rockfill dams have to check the seepage through the dam? 5. Are the side slopes of rockfill usually kept equal to the angle of repose of rock? 6. Where does an arch dam transfer the water pressure and its other forces? 7. How is an arch dam arranged in the vertical plane? 8. How many types of the buttress dams do you know? 9. Is the upstream side of the buttress dams vertical? 10. Why are the buttress dams more expensive than the gravity dams?

UNIT 7

Hydropower Power Plant

Словообразование

Суффикс **-ant(-ent)**, прибавляемый к глаголу, образует существительное, которое указывает на деятеля или профессию:

to assist (помогать) – assist**ant** (помощник);

to correspond (переписываться) – correspond**ent** (корреспондент).

Exercise 1. Form the nouns using the suffix -ant(-ent). Translate them into Russian.

Model: to attend – attendant

-ant: inhabit, serve, inform, resist, ignore, append, combat.

-ent: preside, reside, superintend, depend, insist, differ, oppose.

Суффикс **-ee**, прибавляемый к глаголу, образует существительное, которое указывает на человека, причем данный суффикс является ударным: employ (нанимать) – employ**ee** (работающий по найму).

Exercise 2. Form the nouns using the suffix -ee. Translate them into Russian.

Model: to address – addressee

To assign, to trust, to present, to grant, to promise, to train, to abandon to pay, to interview, to adopt, to absent.

The Verb *To Be* in the Past Indefinite

(Глагол *to be* в прошедшем неопределенном времени)

Утвердительная форма	Отрицательная форма	Вопросительная форма
I was	I was not	Was I?
He was	He was not	Was he?
She was	She was not	Was she?
It was	It was not	Was it?
We were	We were not	Were we?
You were	You were not	Were you?
They were	They were not	Were they?

Exercise 3. Translate the following sentences into Russian.

1. It was very sunny last week. 2. My dog was very angry yesterday morning. 3. I was not in the garden. 4. Was Mark glad to meet Anna yester-

day? 5. Pupils were late for school, weren't they? 6. We were at the museum last month. 7. Tim was not here a year ago, was he? 8. Were you glad to meet us? 9. Wasn't this boy ill a week ago? 10. Who was tired yesterday?

Exercise 4. Make the right choice.

1. My English (was/were) very well ten years ago. 2. He (was/were) very sad yesterday. 3. I (was/were) in the park two hours ago. 4. They (was/were) best friends two years ago. 5. It (was/were) very hot yesterday afternoon. 6. My parents (was/were) in the garden last week.

Exercise 5. Use the verb to be in the Past Indefinite.

1. Harry ... at school yesterday. 2. John and Tina ... in the museum last week. 3. I ... at the station an hour ago. 4. This man ... a farmer the day before yesterday. 5. Who ... in Moscow last Tuesday? 6. Mary ... sick three days ago. 7. He ... at the cinema last night. 8. It ... very hot yesterday. 9. I ... a schoolboy last year. 10. We ... in Dublin last year. 11. My friend ... in the garden yesterday. 12. We ... in town the other day. 13. My father ... a tractor driver a week ago. 14. They ... in the park on Sunday.

The Past Indefinite Active

(Прошедшее неопределенное время в активном залоге)

В английском языке существуют две группы глаголов: правильные (стандартные) и неправильные (нестандартные). Поэтому утвердительные формы в прошедшем неопределенном времени активного залога (The Past Indefinite Active) образуется двумя способами:

1. Правильные глаголы образуют утвердительную форму в прошедшем неопределенном времени (The Past Indefinite Active) посредством добавления к инфинитиву окончания **-ed**, например: to work – **worked**, to like – **liked**.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I worked	I did not work	Did I work?
We worked	We did not work	Did we work?
You worked	You did not work	Did you work?
They worked	They did not work	Did they work?
He worked	He did not work	Did he work?
She worked	She did not work	Did she work?
It worked	It did not work	Did it work?

2. Неправильные глаголы образуют утвердительную форму в прошедшем неопределенном времени не по правилу, так как являются исключениями, и все их формы, собранные в таблицу (смотри страницу 188 данного пособия), нужно заучивать наизусть.

В прошедшем неопределенном времени неправильные глаголы употребляются во второй форме, например: to drink – **drank** – drunk.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I drank	I did not drink	Did I drink?
We drank	We did not drink	Did we drink?
You drank	You did not drink	Did you drink?
They drank	They did not drink	Did they drink?
He drank	He did not drink	Did he drink?
She drank	She did not drink	Did she drink?
It drank	It did not drink	Did it drink?

Прошедшее неопределенное время в активном залоге (The Past Indefinite Active) употребляется:

1) для выражения *единичных действий*, совершенных в прошлом, где момент совершения действия обозначается обстоятельствами времени, такими, как: **yesterday** – вчера, **a year/a month/a week ago** – год/месяц/неделю назад, **last year/month/week** – в прошлом году/месяце/на прошлой неделе, **last night** – вчера вечером, **last Thursday** – в прошлый четверг, **the other day** – на днях, **just now** – только что, **at 8 o'clock, in June, in 2003**:

We *lived* in the country *last month*. – Мы *жили* за городом в *прошлом месяце*;

2) для выражения *действий обычных, повторяющихся или постоянных*, при этом часто употребляются обстоятельства, например: **usually, sometimes, every day**.

He *always came* to the university on time. – Он *всегда приходил* в университет вовремя;

3) для выражения *цепи последовательных действий* в прошлом:

John *took* a book, *opened* it and *began* reading it. – Джон *взял* книгу, *открыл* ее, и *начал* читать.

Exercise 6. Translate the following sentences into Russian.

1. Tom always believed his father. 2. Did Mary go to Central Asia last month? 3. We all visited Mike's party, didn't we? 4. Did the children go to the seaside last week? 5. The university had a good basketball team.

6. Mary didn't sleep at home that evening, did she? 7. When did John run a long distance? 8. Did Peter and Sue meet in York two weeks ago? 9. Sandra got up at 8 yesterday. 10. This sportsman won the World Cup last season.

Exercise 7. Put the verbs in brackets in the Past Indefinite.

1. Alice (have) a sister. 2. She (go) to bed at 11 p. m. 3. Ann (take) a shower before going to bed. 4. When they (return)? 5. She (go) to the institute in the morning. 6. Jane (watch) the new movie? 7. When you (begin) to learn English? 8. Who (close) all the windows in the classroom? 9. After breakfast she (go) to the institute. 10. Pete (come) in time yesterday? 11. Who (invent) the computer? 12. Her friends usually (call) her at about 8 o'clock. 13. He (forget) her birthday? 14. When your parents (get) married?

**The Modal Verbs *Should, Ought to*
(Модальные глаголы *should, ought to*)**

Модальный глагол **should** – *следует, стоит, нужно, должен* используется в предложениях для выражения *совета, обязательства, вероятности* в настоящем и будущем времени. Частица **to** после **should** не употребляется.

Модальный глагол **ought to** – *следует, необходимо, быть должным* используется в тех случаях, когда человек «должен» что-то сделать, исходя из моральных норм поведения, а не потому, что имеется какое-то обязательство.

I We You They He / She It	should should (not) ought to ought (not) to	come the meeting on time. help your friends.
Should	I we you they	visit the agricultural Show?
Ought	he / she it	protect our natural landscapes?

Модальный глагол **should** может употребляться:

1) для выражения *совета*:

You *should* sleep – Тебе *следует* спать;

2) для выражения *обязательства*:

I *should* be at work in an hour. – Я *должен* быть на работе через час;

3) для выражения *вероятности, ожидания*:

By now, they *should* be in Moscow. – К этому времени они уже *должны* быть в Москве (*вероятно*, они уже в Москве).

4) Модальный глагол **should** в сочетании с перфектным инфинитивом употребляется для выражения *невыполненного необходимого* действия, другими словами, того, что следовало бы сделать, но сделано не было:

I *should have stayed* home. – Мне следовало остаться дома.

Модальный глагол **ought to** может употребляться:

1) для выражения *рекомендации, морального долга, совета*:

You *ought to* be more polite with that old lady. – Тебе *следует* быть повежливей с той пожилой дамой;

2) для выражения *мнения*, что именно данное действие будет правильным в той или иной ситуации.

She *ought to* ask her parents for advice first and only then go to the forest. – Ей *следовало бы* сначала спросить совета у своих родителей, а потом уже идти в лес;

3) для выражения *предположения с оттенком уверенности* в значении «*пожалуй*», «*наверное*»:

He *ought to* be able to do everything. – Он, *пожалуй*, сможет сделать все.

4) модальный глагол **ought to** в сочетании с перфектным инфинитивом выражает *порицание, упрек* за то, что не было сделано или было сделано неправильно:

You *ought to have done* it previously. – Тебе следовало сделать это раньше.

Exercise 8. Translate the given sentences into Russian.

A. 1. I think the government should help homeless people. 2. We should think twice before buying that yacht. 3. You shouldn't stay up too late. You'll be tired tomorrow. 4. A real lady should be delicate in her words and doings. 5. She should be very glad to see you. 6. The nights should be cold up there in the mountains. 7. Why should I stay here? 8. Potatoes should grow well here. 9. When is he going back? – How should I know?

10. Do you think I should buy the red or the blue dress? 11. Your secretary should have answered the last phone call yesterday.

B. 1. You ought to say a word or two about yourself. 2. I don't think we ought to grumble. 3. Kings ought to be kings in all things. 4. Oughtn't you to be more careful? 5. A liar ought to have a good memory. 6. I think we ought to go now. 7. We pass our lives in doing what we ought not, and leaving undone what we ought to. 8. Molly hesitated. Ought she to accept this present from a stranger? 9. You ought to remember the rule, it has been explained so many times before. 10. He ought to have done what I told him.

Exercise 9. Read and memorize the following words and word combinations.

alternator ['ɔ:ltnetɪtə] – генератор переменного тока
blade [bleɪd] – лопасть
branch [brɑ:nʃ] – ответвление (*трубопровода*)
cold season [kəʊld 'si:zən] – холодное время года
collision [kə'liʒən] – удар, столкновение
demand [dɪ'mɑ:nd] – спрос
draft tube [dra:ft t(j)u:b] – отсасывающая труба (*гидротурбины*)
forebay ['fɔ:bei] – верхний бьеф; напорный бассейн
gap [gæp] – зазор, расстояние
gate [geɪt] – затвор (*гидротехнический*)
hammer of water ['hæmə əv 'wɔ:tə] – гидравлический удар
high head [haɪ hed] – высокий напор
hydroelectric power plant [ˌhaɪdrəʊ'lektɹɪk 'paʊə plɑ:nt] – гидроэлектрическая станция
intake structure ['ɪnteɪk 'strʌktʃə] – водоприёмное сооружение
kinetic [kɪ'netɪk] – кинетический
lead [li:d] – поступать
non-convention [nɒnkən'venʃən] – нетрадиционный
nozzle ['nɒzl] – сопло
optional component ['ɒpʃnəl kəm'pəʊnənt] – дополнительный компонент
penstock ['penstɒk] – напорный трубопровод
power house ['paʊə haʊs] – машинный зал
reinforced concrete [ˌri:m'fɔ:st,kɒŋkri:t] – железобетон
reject the water [rɪ'dʒekt ðə 'wɔ:tə] – сбрасывать воду
reservoir ['rezəvwa:] – водохранилище
steel rod [sti:l rɒd] – стальной стержень
surge tank [sɜ:ʒ tæŋk] – уравнительный резервуар

tailrace ['teɪlreɪs] – отводящий канал

trash [træʃ] – мусор

trash rack [træʃ ræk] – решётка для задержки плавающего мусора

turbine ['tɜːbaɪn] – турбина

Exercise 10. Read and translate the following text.

The **hydroelectric power plant** is used to convert the **kinetic** energy of water into electrical energy. The kinetic energy is used to rotate the **turbine** and the turbine is connected with an **alternator** to generate electrical energy. A hydroelectric power plant is a **non-convention** power plant and widely used to generate electricity from a renewable source of energy. To achieve kinetic energy from water, the reservoir or dam is constructed at a **high head** from the ground level. Generally, the hydroelectric power plant is constructed in a hilly area. The major components of the hydroelectric power plant are **forebay**, **intake structure**, **penstock**, **surge tank**, turbines, **powerhouse**, **draft tube**, **tailrace**.

The forebay is used to store water temporarily before it passes to the intake structure. The forebay is an **optional component** of a hydroelectric power plant. The reservoir is used to store water across the river. In some hydroelectric power plants, the **reservoir** behaves as a forebay. And the water from the reservoir **leads** to the turbine. The amount of water stored in the forebay is used according to the **demand** for water and load in that area.

The intake structure is a connecting facility between the penstock and forebay. It collects water from the forebay and passes to the penstock. It plays an important role in power plants. The water comes in reservoir or forebay from the river. Therefore, the water contains much **trash** like trees and debris. The intake structure contains **trash racks** placed at the entrance of the penstock. The trash racks are made of **steel rods**. It prevents severe damage to the turbine **blades** and **nozzle**. In trash racks, steel rods are placed with a **gap** of 10 to 30 cm apart. Trash racks are heated in **cold season** to avoid ice boulders **collision** with turbine blade. Due to heat in trash racks, the ice boulders melt at the entrance of the penstock. The trash racks must be clean after a regular time period.

Penstocks are used to increase the velocity of the water. They carry water from the reservoir or intake structure to the turbine. The penstocks are open and close with the **gate**. So, at the time of opening and closing of gates, the pressure of water is very high. Therefore, the penstocks are designed to sustain the **hammer of water**. Short length penstock has heavy wall and long length penstock has surge tank is used to overcome the pressure of water. The penstock is made of steel and **reinforced concrete**.

If the length of penstock is small, separate penstock is used for the turbine. If the length of penstock is large, a single penstock is used and at the end, it divides into **branches**.

A surge tank is a cylindrical tank or chamber placed near the powerhouse and it is connected with the penstock. It is used to control the pressure of water in the penstock. The water level of the surge tank increases when the powerhouse **rejects the water** due to low power demand. So, the surge tank controls the pressure in the penstock. When the power demand is high, a surge tank is used to accelerate the water flow. And in this condition, the water level of the surge tank is reduced. During steady load conditions, the water level becomes constant.

Exercise 11. Translate the following words and word combinations into English using the text.

Гидроэлектрическая станция; кинетическая энергия; вращать турбину; производить электрическую энергию; возобновляемый источник; основные компоненты; хранить воду; водохранилище; турбина; водоприёмное сооружение; мусор; отводящий канал; скорость течения воды; выдерживать гидравлический удар; выдержать давление воды; цилиндрический резервуар; вход в напорный трубопровод; уравнительный резервуар; низкое энергопотребление; лопасть.

Exercise 12. Match adjectives with nouns using the text, translate the combinations.

- | | |
|----------------|--------------|
| 1. high | a) damage |
| 2. hilly | b) length |
| 3. optional | c) head |
| 4. important | d) area |
| 5. severe | e) component |
| 6. short | f) tank |
| 7. cold | g) role |
| 8. cylindrical | h) penstock |
| 9. single | i) season |

Exercise 13. Say whether the following statements are true or false. Correct the false ones using the text.

1. The kinetic energy of water is used to generate electricity. 2. To achieve kinetic energy from water, the dam is constructed at a low head from the ground level. 3. In some hydroelectric power plants the reservoir is used as a forebay. 4. There is no connecting facility between the penstock and forebay. 5. In trash racks, steel rods are placed with a gap of 25 to 50 cm apart. 6. The trash racks are cleaned regularly. 7. The penstocks are always open. 8. The surge tank controls the pressure in the penstock.

Exercise 14. Translate the following words and word combinations into Russian.

Non-convention power plant; generate electricity; achieve kinetic energy; forebay; intake structure; penstock; surge tank; turbine; powerhouse; draft tube; tailrace; demand for water; between the penstock and forebay; water contains much trash; prevent severe damage; blades and nozzle; with a gap of 10 to 30 cm apart; ice boulders; regular time period; pressure of water is very high; branch; cylindrical tank; pressure in the penstock.

Exercise 15. Answer the following questions.

1. What is a hydroelectric power plant used for? 2. A hydroelectric power plant is quite a convention power plant, isn't it? 3. What are the major components of the hydroelectric power plant? 4. What is the reservoir at the power plant is used for? 5. What is the purpose of the intake structure at the power plant? 6. What is the function of trash racks in the intake structure? 7. The trash racks are never cleaned, are they? 8. What are the penstocks designed for? 9. A surge tank is used to control the pressure of water in the penstock, isn't it? 10. How is a surge tank applied when the power demand is high?

UNIT 8

Site Selection for Hydropower Plant

Словообразование

Приставка **anti-**, прибавляемая к существительным или прилагательным, образует слова с отрицательным значением:

social (общественный) – **antisocial** (антиобщественный).

Exercise 1. Form the new words using prefix *anti-*. Translate them into Russian.

Model: league – anti-league

Body, national, clerical, war, slavery, cyclone, thesis, aircraft, toxin.

Приставка **counter-**, прибавляемая к существительным, образует слова с отрицательным значением:

attack (атака) – **counterattack** (контратака).

Exercise 2. Form the new nouns using prefix *counter-*. Translate them into Russian.

Model: espionage – counterespionage

Weight, agent, threat, blast, blow, offensive, revolution, plot, statement.

The Verb *To Be* in the Future Indefinite (Глагол *to be* в будущем неопределенном времени)

Утвердительная форма	Отрицательная форма	Вопросительная форма
I shall be	I shall not be	Shall I be?
We shall be	We shall not be	Shall we be?
He will be	He will not be	Will he be?
She will be	She will not be	Will she be?
You will be	You will not be	Will you be?
They will be	They will not be	Will they be?
It will be	It will not be	Will it be?

Exercise 3. Translate the given sentences into Russian.

1. I shall be at home tomorrow.
2. She will not be angry about it.
3. You will be surprised when you arrive.
4. Will they be together in a year?
5. I shall be a sailor next year.
6. We shall not meet with you, shall we?
7. She will be at work the day after tomorrow.
8. Pete will not be at work anymore.
9. Will you be in Kaliningrad next week?
10. They will not be pilots in the future.
11. I shall be with my parents tomorrow.

Exercise 4. Use the verb *to be* in the Future Indefinite.

1. The party ... great next weekend.
2. They ... married for 10 years next month.
3. The pizza ... ready in 15 minutes.
4. We ... on vacation next month.
5. He ... there soon?
6. He ... a great doctor.
7. I ... a construction worker when I grow up.
8. My sister ... not ... at home the day after tomorrow.
9. She ... at the assembly shop in an hour.
10. He ... in Gomel tomorrow.
11. Tim and Helen ... at the supermarket at nine o'clock.

The Future Indefinite Active (Будущее неопределенное время в активном залоге)

Будущее неопределенное время в активном залоге (The Future Indefinite Active) образуется при помощи вспомогательных глаголов **shall** (для первого лица единственного и множественного числа), **will** (для второго и третьего лица единственного и множественного числа) и основы смыслового глагола.

Вспомогательный глагол **shall** используется для обращения с просьбой о совете: What **shall I do?**, чтобы выразить готовность выполнить какое-либо распоряжение: **Shall I help** you? и выразить предложение: **Shall we go** out this evening?

Утвердительная форма	Отрицательная форма	Вопросительная форма
I shall work	I shall not work	Shall I work?
We shall work	We shall not work	Shall we work?
You will work	You will not work	Will you work?
They will work	They will not work	Will they work?
He will work	He will not work	Will he work?
She will work	She will not work	Will she work?
It will work	It will not work	Will it work?

Будущее неопределенное время в активном залоге (The Future Indefinite Active) употребляется для выражения:

1) *предсказаний* в будущем:

It looks as if Jack *will lose* his job. – Похоже, Джек *потеряет* свою работу;

2) *цепи последовательных действий* в будущем:

Phil *will ring* you up and *tell* you everything. – Фил *позвонит* тебе и все тебе *расскажет*;

3) *однократного действия* в будущем:

The factory *will open* in July. – Фабрика *откроется* в июле;

4) *просьб*:

Will you *give* me your pencil? – *Дай* мне, пожалуйста, свой карандаш;

5) *обещаний*:

I promise, you *will not lose* your job. – Я обещаю, ты не *потеряешь* свою работу.

При выражении будущих действий часто употребляются следующие обстоятельства времени: **tomorrow** – *завтра*, **tonight** – *сегодня вечером*, **next week/month/year** – *на следующей неделе/в следующем месяце/году*, **in two days** – *через два дня*, **in a week/an hour** – *через неделю/через час*, **the day after tomorrow** – *послезавтра*, **soon** – *скоро*.

Exercise 5. Translate the following sentences into Russian.

1. It won't rain tomorrow. 2. Daniel will attend language courses next year, won't he? 3. His cousin will buy the tickets in two days. 4. Will Nora plant flowers tomorrow? 5. I shall do the ironing after dinner. 6. Whose report will you read soon? 7. Who will have a picnic in the park? 8. You will write the invitations for tomorrow's party. 9. Will Mark not go to the swimming-pool next Tuesday? 10. Where will Alex come at seven o'clock?

Exercise 6. Put the verbs in brackets in the Future Indefinite Active.

1. I (play) baseball tomorrow in the evening. 2. Grandparents (not, watch) TV the day after tomorrow. 3. Nick (go) to the cinema in two days? 4. Nick (fly) to Japan next month. 5. Tom and Mike (come) to my place in an hour? 6. You (buy) this book soon? 7. What you (do) in three days?

8. What your friend (do) tomorrow? 9. You (show) me the way to the theatre tomorrow? 10. They (not, take) care of the garden next summer.

6) В английском языке имеются случаи, когда будущее время для выражения будущих действий не употребляется, что имеет место в придаточных предложениях *условия и времени*.

6.1) Условие, содержащееся в условном придаточном предложении, рассматривается говорящим как реально предполагаемый факт, относящийся к будущему времени. В этом случае сказуемые главного предложения выражаются в *Future Indefinite*, а сказуемые придаточного в *Present Indefinite*. Союзами, посредством которых придаточные предложения присоединяются к главным, являются: **if** – *если*, **in case** – *в случае если*, **suppose (that) /supposing** – *предположим, что*, **unless** – *если не*, **provided (that) /providing** – *при условии, что*:

If + Present Indefinite,	Future Indefinite.
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If the weather is good, we *will go* skiing. – Если погода будет хорошей, мы пойдем кататься на лыжах.

Exercise 7. Translate the following sentences into Russian.

1. I will buy a dog if you give me money. 2. In case you help me, I will finish homework in time. 3. If you have time, will you watch this movie with me? 4. If you do not have much work today, will you come? 5. If you leave, turn off the light, please. 6. Will I feel better if I drink this juice?

Exercise 8. Put the verbs in brackets in the correct forms.

1. Suppose I (go) to bed late, I'll feel bad in the morning. 2. If you (see) him, you'll give him my letter? 3. We (watch) a movie if you come home early. 4. You'll come to the party if she (invite) you? 5. Providing I (have) enough money, I'll buy a car. 6. You (not find) a good job unless you (study) well. 7. Supposing she (work) well, she will get promoted.

6.2) В придаточных предложениях *времени* сказуемые главного предложения употребляются в *Future Indefinite*, а сказуемые придаточного в *Present Indefinite*. Союзами, посредством которых придаточные предложения присоединяются к главным, являются: **when** – *когда*, **before** – *перед тем как*, **after** – *после того как*, **while** – *в то время как*, **till** – *пока, до тех пор пока (не)*, **until** – *(до тех пор) пока (не)*, **as soon as** – *как только*:

Jasmin will answer *when* she is ready. – Жасмин ответит, когда будет готова.

Exercise 9. Translate the following sentences into Russian.

1. When the rain stops, we shall go out. 2. I shall send you a postcard when I am on holiday. 3. Wait here until I come back. 4. Before you leave,

you must visit the gallery. 5. Before you leave, don't forget to shut the window. 6. Nick will phone you as soon as he arrives in London.

Exercise 10. Put the verbs in brackets in the correct forms.

1. Before John (start) for London, he (come) to my place. 2. You (invite) Tom to our party when you (see) him? 3. You (not, go) until I (know) the truth. 4. You (phone) me as soon as you arrive in London? 5. Henry (be busy) when we (return) home? 6. Don't get off the bus until it (stop).

The Modal Verb *Can*
(Модальный глагол *can*)

Модальный глагол **can** (*мочь, уметь*) имеет две формы: настоящее время **can** и прошедшее время **could**. Для выражения действия в будущем времени вместо глагола **can** используется эквивалент **shall/will be able to**.

I We He It She You They	can cannot / (can't) could could not / couldn't		read and speak Chinese. retell this poem by heart.
Can Could	I he /she /it we /you /they	solve this problem?	
I We	shall	(not) be able	to plant a lot of trees and shrubs.
He She It You They	will		
Shall	I we	be able	to repair my car?
Will	he she it you they		

Модальный глагол **can** имеет значение возможности или способности как физической, так и умственной. Он может использоваться для выражения просьбы, разрешения или запрещения, а также вероятности или невероятности, например:

1) выражает *физическую способность*:

I can ride a horse. – Я умею ездить на лошади;

2) выражает *умственную способность*:

Tom could read French last year. – Том умел читать по-французски;

3) выражает *общепринятые утверждения* в настоящем времени:

Flowers can grow faster if they get a lot of sunshine. – Цветы могут расти быстрее, если они получают много солнечного света;

4) выражает *запрещение* (в отрицательной форме):

She cannot stay out after 10 p.m. – Она не может гулять после 10 вечера.

5) выражает *разрешение*:

You can use dictionaries. Ты можешь пользоваться словарями;

6) выражает *просьбу*:

Can you hand me the stapler? – Не можешь передать мне степлер?

7) выражает *вероятность*:

Any student can become a professor. – Любой студент может стать профессором;

8) выражает значение *малой, сомнительной вероятности*, а также *досады и недоумения* в отрицательной и вопросительной форме:

It can't cost more than a dollar. – Не может быть, чтобы это стоило дороже доллара.

Can she be working now? – Неужели она сейчас работает?

9) модальный глагол **can** в сочетании с перфектным инфинитивом выражает *сомнение в прошлом*:

He can't have fallen asleep at the meeting. – Он не мог уснуть во время встречи (=Не может быть, чтобы он уснул во время встречи).

Can she have said this? – Неужели (Разве) она сказала это?

Exercise 11. Translate the following sentences into Russian.

1. Mike can run very fast. 2. They cannot understand French. 3. Can Kate speak English well? 4. My brother will be able to come and help you in the garden. 5. What language could you speak last year? 6. Who can help me with mathematics? 7. His little sister can walk already, can't she? 8. The children couldn't carry this box yesterday, could they? 9. Why can't your friend come in time? 10. This woman won't be able to sleep at night. 11. They can't have played football very well. 12. Can he have done it?

Exercise 12. Choose the correct variant.

1. *Can / Could* Sally learn a long poem by heart when she was four?
2. When Mrs. Rover was a teenager she *couldn't / can't* play the piano.
3. John says he *could / can* speak French perfectly well.
4. What *can / could* Melody do when she was nine?
5. Tomorrow Molly *couldn't / will not be able to* borrow a book from the local library because she hasn't returned another one.
6. Rita said she *couldn't / can't* learn that because she was busy.

Exercise 13. Translate the words in bracket using *can* or *be able to* in the correct tense form.

1. Children (нельзя) discuss such things.
2. Certainly, Nick (мог) translate that article.
3. (мог бы) Nick show me that picture? (*polite*)
4. Molly (не могла) wait for us.
5. You (сможете) get there in 10 minutes.
6. The swimmer (смог) reach the sea shore.
7. Steven (мог) work fifteen hours a day before his illness.
8. Tom (не может быть, чтобы) smoke so much!

Exercise 14. Read and memorize the following words and word combinations.

- check [ʃek] – проверять, сравнивать
earthquake ['z:θkweɪk] – землетрясение
free from pollution [fri: frəm pə'lu:ʃən] – не содержащий загрязняющих веществ
land slide [lənd slaɪd] – оползень, обвал
location [ləu'keɪʃən] – расположение
pondage ['pɒndɪdʒ] – водохранилище
reasonable price ['ri:zənəbl praɪs] – разумная цена, сходная цена
stress [stres] – напряжение (*механическое*), нагрузка
thrust [θrʌst] – горизонтальное или боковое давление, надвиг
thunderstorm ['θʌndəstɔ:m] – гроза
transportation facility [,træns'pɔ:teɪʃən fə'sɪlətɪ] – транспортная инфраструктура
water head ['wɔ:tə hed] – напор; высота напора воды
water storage capacity ['wɔ:tə 'stɔ:rɪdʒ kə'pæsətɪ] – объем водохранилища
withstand [wɪð'stænd] – выдержать (*неблагоприятные условия*)

Exercise 15. Read and translate the following text.

Location. The **location** of a hydroelectric power plant is a highly important factor because the construction of such a plant requires very high capital investments. Here are some factors that must be considered while selecting a site for the hydroelectric power plant.

Availability of water. Water is the main requirement of a hydropower plant. Without water, this plant cannot operate. So, the plant must be constructed on land where the water is available throughout the year. In most cases, the hydropower plant is constructed over a river or canal to meet the high water demand. One should check the previous years' data of rainfall to confirm the availability of water.

Water storage capacity. The natural main source of water is rainfall or melting of the ice mountain. In some countries, the rainfall is seasonal. So, to use plants throughout the year, we need to store an enormous amount of water. For that, a dam or **pondage** is constructed near the powerhouse. The **water storage capacity** will decide the capacity of power generation and how much time it can operate without rainfall.

Water head. The hydropower plant uses the kinetic energy of water. If we have a high **water head** naturally, we can use the kinetic energy to rotate the turbine. In most cases, the dam is constructed in hilly areas where the water head is available naturally. So, it is necessary to select a site with a high head available naturally.

Transportation facility. The hydropower plant requires heavy machinery to operate the plant as well as while constructing a dam, powerhouse, etc. Therefore, the selected site must have an adequate **transportation facility** to transport necessary machinery. Also, the power plant site must be accessible for rail or road transport. And, in addition, at the time of construction, it requires huge manpower.

Cost of land. The initial cost of this hydropower plant is very high. So, the land that is used to build dams and powerhouses must be available at a **reasonable price**.

Water pollution. Water is the main fuel of the power plant. If the polluted water is supplied to the turbine blade, it may damage the turbine blade. And that will reduce the life of the turbine. Therefore, the supplied water must be **free from pollution**.

Geological data. The place chosen for a plant is capable to **withstand** the **thrust** of water and other **stress**. There should not be any probability of **land sliding**. Otherwise, there are chances for a dam to fall which will create the flood situation in nearby areas. Before constructing a dam, we need to **check** the previous year's data of **earthquakes, thunderstorms**, etc.

Exercise 16. Point out the best answers to the questions.

1. Why is the location of a hydroelectric power plant is a highly important factor?

- a) the construction of such a plant requires much scientific research;
- b) the construction of such a plant requires high capital investments;
- c) the construction of such a plant requires highly talented people.

2. What is the main requirement of a hydropower plant?
 - a) the construction must be carried out in the area with much rainfall;
 - b) hydropower plant should be constructed over any river or canal;
 - c) water must be available throughout the year.
- 3) What must we have to use the kinetic energy to rotate the turbine?
 - a) we must construct the dam in suitable areas;
 - b) we can always apply a high water head;
 - c) we must have a high head available naturally in hilly areas.
4. Why must the selected site have an adequate transportation facility?
 - a) transportation facility is necessary to transport machinery;
 - b) the selected site is important for huge manpower;
 - c) while constructing a dam, powerhouse must be well-equipped.
5. Why must the supplied water be free from pollution?
 - a) because the polluted water is not used to generate electricity;
 - b) because the polluted water rotates the turbine slowly;
 - c) because the polluted water may damage the turbine blades.
6. What do before constructing a dam?
 - a) we need to check if plant is capable to withstand the thrust of water;
 - b) we need to check the probability of dam collapse;
 - c) we need to check all the data of earthquakes, thunderstorms, etc.

Exercise 17. Translate the following words and word combinations into Russian.

Location of a hydroelectric power plant; capital investments; some factors; throughout the year; meet the high water demand; data of rainfall; availability of water; source of water; seasonal; pondage; kinetic energy; rotate the turbine; hilly areas; heavy machinery; powerhouse; huge manpower; initial cost; reasonable price; main fuel; polluted water; turbine blade; reduce the life; build dams and powerhouses; free from pollution.

Exercise 18. Read the text and insert the necessary propositions.

1. The location ... a hydroelectric power plant; 2. a site ... the hydroelectric power plant; 3. water is available ... the year; 4. the hydropower plant is constructed ... a river; 5. pondage is constructed ... the powerhouse; 6. the capacity ... power generation; 7. operate ... rainfall; 8. a site ... a high head available; 9. accessible ... rail transport; 10. available ... a reasonable price; 11. probability ... land sliding.

Exercise 19. Complete the sentences using the text.

1. The plant must be constructed on land ____ .
2. To use plants throughout the year, we need ____ .
3. It is necessary to select a site ____ .
4. Therefore, the selected site must have ____ .
5. If the polluted water is supplied to the turbine blade, ____ .
6. Otherwise, there are chances for a dam to fall ____ .

Exercise 20. Translate the following words and word combinations into English using the text.

Гидроэлектростанция; капитальные вложения; главное требование; без воды; данные о количестве осадков за предыдущие годы; потребность в воде; наличие воды; тяжелая техника; машинный зал; транспортная инфраструктура; высота напора воды; строить плотины; автомобильный транспорт; время строительства; большое количество рабочей силы; сократить срок службы турбины; выдерживать напор воды; создать ситуацию наводнения; землетрясения; грозы; проверять.

UNIT 9

Tunnels

Словообразование

Приставка **de-**, прибавляемая к глаголам или существительным, образует слова с отрицательным значением:

to militarize (милитаризировать) – **demilitarize** (демилитаризовать).

Exercise 1. Form the new words using prefix *de-*. Translate them into Russian.

Model: to civilize – to decivilize

To colonize, to code to compose, to mobilize, to moralize, to gasify.

Приставка **dis-**, прибавляемая к глаголам, существительным и прилагательным, образует слова с отрицательным значением:

to appear (показываться) – to **disappear** (исчезать);

advantage (преимущество) – **disadvantage** (неудобство);

loyal (верный) – **disloyal** (нелояльный).

Exercise 2. Form the new words using prefix *dis-*. Translate them into Russian.

Model: to please – to displease

To arrange, honesty, similar, union, to connect, to like, to agree.

**The Verb *To Have* in the Present, Past, Future Indefinite
(Глагол *to have* в настоящем, прошедшем, будущем
неопределенном времени)**

Глагол **to have** означает *иметь, обладать* и выражает отношение принадлежности.

I *have* a good car. – У меня *есть* хороший автомобиль.

He *had* a big house. – У него *был* большой дом.

They *will have* a small office. – У них *будет* небольшой офис.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I have We have You have They have He has She has It has	I have not We have not You have not They have not He has not She has not It has not	Have I? Have we? Have you? Have they? Has he? Has she? Has it?
I had We had You had They had He had She had It had	I had not We had not You had not They had not He had not She had not It had not	Had I? Had we? Had you? Had they? Had he? Had she? Had it?
I shall have We shall have You will have They will have He will have She will have It will have	I shall not have We shall not have You will not have They will not have He will not have She will not have It will not have	Shall I have? Shall we have? Will you have? Will they have? Will he have? Will she have? Will it have?

Exercise 3. Translate the following sentences into Russian.

1. Peter had a tape recorder last year. 2. You have many relatives there now. 3. My sister will have music lessons next week. 4. The children had many toys a week ago. 5. We have coffee every day in the afternoon. 6. Her daughter had a car last year. 7. The children will have lunch in half an hour. 8. Jane will have a dog the day after tomorrow. 9. I have a bath once a week. 10. Tom had this book on physics last month. 11. We have a lot of snow this winter. 12. Sue and John had breakfast an hour ago.

Exercise 4. Use the correct form of the verb *to have*.

1. His uncle ... a garden now. 2. I ... paper to write a letter soon. 3. I ... a collection of Shakespeare's plays last month. 4. He ... a new bicycle when he was a schoolboy. 5. She always ... a great sense of humor. 6. Yesterday they ... a lot of sweets. 7. Kate ... a bad feeling about this tomorrow. 8. She ... a bad dream the other day. 9. She ... a good plan the day after tomorrow. 10. She ... a rest in the afternoon yesterday. 11. We ... a breakdown on the motorway a month ago. 12. We ... dinner at a lovely restaurant last night.

The Word Order (Порядок слов)

Предложения в английском языке имеют твердый порядок слов и выстраиваются по определенной схеме, элементы которой нельзя менять местами.

1. Подлежащее	2. Сказуемое	3. Дополнение			4. Обстоятельство		
		беспредложное косвенное	прямое	предложное косвенное	образа действия	места	времени
The buyers	chartered		a steamer				
We	sent	the buyers	the documents				
We	sent		the documents	to the buyers			
The sellers	received		a telegram	from the buyers			
I	met		him		by chance	at the theatre	a few days ago

Иногда обстоятельства времени и места могут стоять перед подлежащим:

Last night he talked to her. – *Прошлой ночью* он говорил с ней.

In the quietness of the flat the telephone rang softly. – В тишине квартиры тихо зазвонил телефон.

Обстоятельства времени стоят обычно после дополнений, а если дополнения нет, то после глагола-сказуемого:

I had a letter this morning. – *Сегодня утром* я получил письмо.

Robert will return in half an hour. – Роберт вернется *через полчаса*.

Если в предложении есть другие обстоятельства, то обстоятельства образа действия стоят перед обстоятельствами места и времени, например:

They worked hard at home yesterday. – Они *усердно* работали *дома* *вчера*.

Обстоятельства образа действия, выраженные наречиями, ставятся после глагола-сказуемого и его дополнения (если оно есть в наличии); они могут также стоять перед сказуемым, но после глагола **to be**, после вспомогательных и модальных глаголов:

I am going to speak to Peter seriously. – Я собираюсь поговорить с Питером *серьезно*.

Maggie quietly entered the room. – Мэгги *тихо* вошла в комнату.

The boy was thoughtfully looking at the picture. – Мальчик *задумчиво* смотрел на картину.

Boris can quickly read and write. – Борис может *быстро* читать и писать.

Если в предложении есть несколько обстоятельств времени, то обстоятельство, которое указывает более точное, время ставится перед обстоятельством, которое указывает время в более обобщенном виде:

I was there at eight this evening. – Я был там *в восемь сегодня вечером*.

Обстоятельства, выраженные наречиями **always** – *всегда*, **often** – *часто*, **sometimes** – *иногда*, **seldom** – *редко*, **never** – *никогда*, **already** – *уже*, **usually** – *обычно* и др., ставятся между подлежащим и сказуемым, но если в составе сказуемого есть глагол **to be**, вспомогательные или модальные глаголы, то после них:

I never heard her name. – Я *никогда* не слышал ее имя.

Gerald will never forget this. – Джеральд *никогда* этого не забудет.

Max was always alone. – Макс *всегда* был один.

Exercise 5. Put the words in the correct order to make sentences.

1. I drive (every morning, to work).
2. She goes (by train, to Moscow, every month).
3. He studied (last year, a lot, at university).
4. The quartet performed (at the recital, magnificently, last night).
5. They walked (through the park, home, this afternoon).
6. He travels (by train, home, every day).

Exercise 6. Make the right choice.

1. Often/the cinema/the Milnes/to/go:
 - a) The Milnes go to the cinema often;
 - b) The Milnes often go to the cinema.
2. Cigarettes/his/give/him:
 - a) Give his cigarettes him;
 - b) Give him his cigarettes.
3. The theatre/go/often/very/we/to:
 - a) We go to the theatre very often;
 - b) We very often go to the theatre;
4. Him/give/to/cigarettes/his:
 - a) Give to him his cigarettes;
 - b) Give his cigarettes to him.

5. The news/yesterday/saw/television/I/on:
 a) Yesterday I saw the news on television.
 b) I saw on television the news yesterday;
 6. The novel/much/I/very/liked:
 a) I liked very much the novel;
 b) I liked the novel very much.
 7. To/came/the office/he/yesterday/taxi/by:
 a) He came by taxi to the office yesterday;
 b) He came to the office by taxi yesterday;
 8. The table/and/on/is/there/two/a book/pens:
 a) There is a book and two pens on the table;
 b) There is two pens and a book on the table;

The Construction *There + be* (Конструкция *there + be*)

Если необходимо в предложении выразить мысль о предмете и его местонахождении, то она передается в английском языке двумя разными способами:

1) если мы строим предложение на русском языке, начиная с обстоятельства места, и ведем речь о том предмете, который нам известен, то на английском языке необходимо употреблять конструкцию **there + be**, например:

*На столе находится ручка. – **There is a pen on the table;***

2) если мы строим предложение на русском языке, начиная с предмета, и хотим сообщить о его местонахождении, то сам предмет в предложении находится на месте подлежащего, например:

*Ручка находится на столе. – **The pen is on the table.***

Синтаксическая конструкция **there + be** используется следующим образом – утвердительная и отрицательная формы:

There	is (not)	a pencil chalk	on the table.
	are (not)	books	
	was (not)	a pen coffee	
	were (not)	pictures	
	will (not) be	a journal boxes tea	

вопросительная форма:

Is	there	a pencil chalk	on the table?
Are		books	
Was	there	a pen coffee	
Were		pictures	
Will	there be	a journal boxes tea	

Exercise 7. Translate the following sentences into Russian.

1. There is a sofa in the room now. 2. There will be something important to deal with tomorrow. 3. There were a few ways of solving this task yesterday. 4. There are five portions of lunch in the kitchen. 5. There were a few apples on the table five minutes ago. 6. There will be two chairs in the room soon. 7. How much water is there in the bottle now? 8. How many dogs are there in this park now? 9. What was there in the box a week ago? 10. There'll be enough time for everyone, won't there? 11. There aren't any people at the party today. 12. There is no rule without an exception.

Exercise 8. Use the appropriate forms of the verb to be.

1. There ... books on the table now. 2. There ... an armchair in the corner yesterday. 3. There ... two men in the living room tomorrow. 4. There ... children at the table in half an hour. 5. There ... no newspapers on the shelf the day before yesterday. 6. There ... two men and several women in the shop next Saturday. 7. There ... no wardrobe in my room soon. 8. There ... a lot of furniture in the living room today. 9. There ... plenty of people in the park tomorrow. 10. There ... five combines in the field the other day.

Exercise 9. Read and memorize the following words and word combinations.

arched [ɑ:tʃt] – сводчатый, куполовидный, арочный
 blasting ['blɑ:stɪŋ] – взрывные работы
 boring ['bɔ:rɪŋ] – проходка (туннеля)
 brickwork ['brɪkwɜ:k] – кирпичная кладка (сооружение)
 command centre [kə'mɑ:nd 'sentə] – командный центр
 connecting tunnel [kə'nektɪŋ 'tʌnəl] – подземный ход сообщения
 drain [dreɪn] – дренажная канава, дрена; водосток
 drainage ['dreɪnɪdʒ] – осушение, дренаж
 drawbridge ['drɔ:brɪdʒ] – разводной мост, подъёмный мост
 drilling ['drɪlɪŋ] – бурение

footprint ['fʊtprɪnt] – размер(ы) опорной поверхности
 light manufacturing [laɪt mænjuˈfæktʃəriŋ] – легкая промышленность
 mine tunnel [maɪnˈtʌnəl] – горный туннель
 motor-traffic tunnel [ˈməʊtə-ˈtræfɪkˈtʌnəl] – автомобильный туннель
 navigational considerations [ˌnævɪˈgeɪʃənəl kənˌsɪdəˈreɪʃənz] – вопросы
 навигации
 opening [ˈəʊpənɪŋ] – въезд-выезд, портал (*туннеля*)
 ore-processing plant [ɔːˈprəʊsesɪŋ plɑːnt] – горнообогатительный
 комбинат
 passageway [ˈpæsɪdʒweɪ] – проход, путь сообщения
 rail road tunnel [reɪl rəʊdˈtʌnəl] – железнодорожный туннель
 reinforcement [ˌriːnˈfɔːsmənt] – придание жёсткости
 rock bolts [rɒk bəʊlts] – штанговая крепь
 save [seɪv] – *зд.* за исключением, кроме
 sewage [ˈs(j)uːɪdʒ] – сточные воды; нечистоты
 sewer system [ˈsuəʊˈsɪstəm] – канализационная система
 shaft [ʃɑːft] – шахта
 shipping channel [ˈʃɪpɪŋ ʃænl] – судоходный канал
 shotcrete [ˈʃɒtkriːt] – торкретбетон; торкетирование
 signal lights [ˈsɪgnəl laɪts] – световая сигнализация
 smooth lining [smuːðˈlaɪnɪŋ] – гладкая футеровка
 span [spæn] – пролёт (*моста*)
 special monitoring system [ˈspeʃəlˈmɒnɪtərɪŋˈsɪstəm] – система специ-
 ального контроля
 stabilize [ˈsteɪbəlaɪz] – укреплять, придавать устойчивость
 steel beam [stiːl biːm] – стальная балка
 steep [stiːp] – крутой подъём
 steep grade [stiːp greɪd] – крутой склон, крутой подъём
 storage of oil and water [ˈstɔːrɪdʒ əv ɔɪl ənd ˈwɔːtə] – хранение нефте-
 продуктов и воды
 storm drainage [stɔːmˈdreɪnɪdʒ] – отвод ливневых вод
 tunnel boring machine [ˈtʌnəlˈbɔːrɪŋ məˈʃiːn] – буровая туннелепро-
 ходческая машина
 underground chamber [ˈʌndəgraʊndˈʃeɪmbə] – подземное помещение
 warehouse [ˈweəhaʊs] – склад
 water crossing [ˈwɔːtəˈkrɒsɪŋ] – подводный переход
 water tunnel [ˈwɔːtəˈtʌnəl] – *тех.* гидроканал
 water-treatment plants [ˈwɔːtə-ˈtriːtmənt plɑːnts] – водоочистные со-
 оружения

waterway ['wɔ:təweɪ] – водный путь (*система каналов*)

waterworks ['wɔ:təwɜ:ks] – водопроводная станция; водопроводные сооружения

Exercise 10. Read and translate the following text.

Tunnel is an underground **passageway**. Usually they are completely enclosed on all sides (**save** the **openings**) for the length of the covered area. Tunnels were known in ancient times. They were, for instance, driven into the rock under the Pyramids of Egypt, and the Romans built one in Rome for their chief **drain**, parts of which still remain. One of the earliest tunnels known was made in Babylon. It passed under the Euphrates River and was built of **arched brickwork** being 12 feet high and 15 feet wide. Other ancient tunnels were built for water supply and for **drainage**. Tunnels are dug through hills and mountains, and under cities and **waterways**.

Tunnels also carry large volumes of water for hydroelectric power plants. Some tunnels provide fresh water for irrigation or drinking, and others transport wastes in **sewer systems**. For **water crossings**, a tunnel is generally more costly to construct than a bridge. However, **navigational considerations** may limit the use of high bridges or drawbridge **spans** when intersecting with **shipping channels** at some locations, necessitating use of a tunnel. Additionally, bridges usually require a larger **footprint** on each shore than tunnels; in areas with particularly expensive real estate, such as Manhattan and urban Hong Kong, this is a strong factor in tunnels' favor.

Tunnels have many uses: for mining ores, for transportation – including road vehicles, trains, subways, and canals – and for conducting water and sewage. **Underground chambers**, often associated with a complex of **connecting tunnels** and **shafts**, increasingly are being used for such things as underground hydroelectric-power plants, **ore-processing plants**, pumping stations, vehicle parking, **storage of oil and water**, **water-treatment plants**, **warehouses**, and **light manufacturing**; also **command centres** and other special military needs.

There are four main types of tunnels. They are: 1) **rail road tunnels**, 2) **motor-traffic tunnels**, 3) **water tunnels** and 4) **mine tunnels**.

Railroad tunnels. Among the world's greatest engineering achievements was the **boring** of long railroad tunnels through the rocks of the Alps and the Rocky Mountains. Railroad tunnels reduce traveling time and increase the efficiency of trains. The **steeper grades** a locomotive must climb, the less weight it can pull.

Motor-traffic tunnels. These tunnels provide routes for automobiles, trucks, and other motor vehicles. Such tunnels have special equipment to remove exhaust fumes. For example, the Holland Tunnel, which is situated under the Hudson River and which links New York City and New Jersey, uses electric fans for ventilation. These fans are capable of completely changing the air in the tunnel every 90 seconds. Many motor-traffic tunnels also have **signal lights** and **special monitoring systems** to help prevent traffic jams.

Water tunnels. Many tunnels provide water to city **waterworks**, to hydroelectric power plants or to farms for irrigation. Others carry out **storm drainage** or sewage. Most water tunnels measure 10 to 20 feet (3 to 6 meters) or more in diameter, and they have **smooth linings** that help the water flow. Many tunnels carrying water to hydroelectric power plants are lined with steel to withstand extremely high water pressures.

Mine tunnels. Mine tunnels are crucial for extracting valuable minerals from beneath the Earth's surface. The construction of mine tunnels involves various techniques, such as **drilling** and **blasting** or using **tunnel boring machines**, and requires careful planning and **reinforcement** to ensure a safe working environment. The reinforcement involves installing **steel beams**, **rock bolts**, and **shotcrete** to **stabilize** the tunnel walls and ceiling.

Exercise 11. Say whether the following statements are true or false. Correct the false ones using the text.

1. One of the earliest tunnels made in Babylon passed under the Euphrates River. 2. Tunnels are never constructed at the hydroelectric power plants. 3. Tunnels have only one function i.e. to transport water. 4. There exist four main types of tunnels. 5. Railroad tunnels increase the efficiency of trains. 6. Motor-traffic tunnels are fitted with electric fans for ventilation. 7. Most water tunnels measure 5 to 10 feet in diameter. 8. The construction of mine tunnels requires careful planning and reinforcement.

Exercise 12. Translate the following words and word combinations into English using the text.

Протяжение всей крытой части; главная дренажная канава; сводчатая кирпичная кладка; канализационная система; древние туннели; водоснабжение; подземный ход сообщения; шахта; водоочистные сооружения; подземное помещение; гидроканал; размер(ы) опорной поверхности; железнодорожный туннель; взрывные работы; автомобильный туннель; крутой склон; придание жёсткости; буровая туннелепроходческая машина; производственные условия; бурение.

Exercise 13. Make up word combinations using the text and translate them.

- | | |
|-----------------|-------------------|
| 1. underground | a) equipment |
| 2. chief | b) systems |
| 3. arched | c) minerals |
| 4. sewer | d) achievements |
| 5. navigational | e) needs |
| 6. special | f) passageway |
| 7. military | g) environment |
| 8. engineering | h) drain |
| 9. valuable | i) brickwork |
| 10. working | j) considerations |

Exercise 14. Translate the following words and word combinations into Russian.

Through hills and mountains; under cities and waterways; water for irrigation or drinking; water crossing; drawbridge span; shipping channel; larger footprint; sewage; underground chamber; tunnel and shaft; warehouse; ore-processing plant; rail road tunnel; motor-traffic tunnel; water tunnel; mine tunnel; climb; smooth linings; signal lights; special monitoring system; waterworks; drilling; blasting; shotcrete; reinforcement.

Exercise 15. Translate the words and word combination in brackets into English using the text.

1. (Туннели) are dug through (возвышенности и горы), and under cities and (водные пути). 2. However, (вопросы навигации) may limit the use of high bridges or (пролеты разводного моста) when intersecting with (судоходные каналы) at some locations. 3. Among the world's (величайшие инженерные достижения) was the (проходка) of long railroad tunnels (сквозь горные массивы Альп) and the Rocky Mountains. 4. The reinforcement involves installing (стальные балки, штанговая крепь, и торкретбетон) to stabilize the tunnel (стены и потолок).

Exercise 16. Answer the following questions.

1. What are the tunnels like? 2. What kind of water do some tunnels provide? 3. What are underground chambers often associated with? 4. What are the main types of tunnels? 5. How do the railroad tunnels increase the efficiency of trains? 6. What are motor-traffic tunnels fitted with to prevent traffic jams? 7. What are dimensions of most water tunnels? 8. What techniques does the construction of mine tunnels involve?

UNIT 10

Tunnel Construction

Словообразование

Приставки **en-(em-)**, прибавляемые к существительным или прилагательным, образуют глаголы:

cage (клетка) – to **encage** (сажать в клетку);

Exercise 1. Form the new words using prefixes en-(em-). Translate them into Russian.

Model: rank – to enrank

en- trap, danger, able, act, close, circle, frame, plane, camp, queue;

em- bed, body, blaze, blazon, boss, bow, brace, brangle, brittle.

Приставка **mis-**, прибавляемая к глаголам или существительным, образует слова, выражающие неправильное или неточное выполнение действия:

to direct (направлять) – to **misdirect** (неправильно направлять);

fortune (везение) – **misfortune** (неудача).

Exercise 2. Form the new words using prefix mis-. Translate them into Russian.

Model: to manage – to mismanage

To translate, to guide, to pronounce, information, location, persuasion.

The Present Continuous Active

(Настоящее продолженное время в активном залоге)

Настоящее продолженное время в активном залоге (The Present Continuous Active) является сложной видовременной формой, которая образуется при помощи вспомогательного глагола **to be** в настоящем времени и причастия настоящего времени (The Participle I) смыслового глагола. Причастие настоящего времени (The Participle I) образуется от инфинитива присоединением окончания **-ing**: to lead – **leading**, to pay – **paying**. При этом соблюдаются следующие правила орфографии:

1. Немая буква **e** на конце глагола перед окончанием **-ing** опускается, например: to take – **taking**.

2. Конечный согласный звук удваивается, если ему предшествует краткий ударный гласный: to put – **putting**, to refer – **referring**.

3. Буква **l** в конце слова всегда удваивается: to travel – **travelling**.

4. Буква **у** в конце слова сохраняется, независимо от того, какой звук ей предшествует, например: to study – **studying**, to stay – **staying**.

5. Буквосочетание **-ie** в конце слова заменяется на **-y**: to tie – **tying**.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I am working	I am not working	Am I working?
He is working	He is not working	Is he working?
She is working	She is not working	Is she working?
It is working	It is not working	Is it working?
We are working	We are not working	Are we working?
You are working	You are not working	Are you working?
They are working	They are not working	Are they working?

Настоящее продолженное время в активном залоге (The Present Continuous Active) употребляется для выражения:

1) длительного действия, совершающегося в *момент речи* с такими обстоятельствами времени, как **today** – *сегодня*, **nowadays** – *в наши дни*, **now** – *сейчас*, **still** – *все ещё*, **at present** – *в настоящее время*, **at the moment** – *в данный момент*:

She is typing a letter now. – Она печатает письмо сейчас;

2) длительного действия, совершающегося в *настоящий период* времени, но необязательно в *момент речи*:

Catherine wants to work in Italy, so she is learning Italian. – Катрин хочет работать в Италии, поэтому она учит итальянский язык;

3) будущего *запланированного* действия (в предложении иногда есть обстоятельство, указывающее на будущее):

Now listen, Roger is coming home tomorrow. – Сейчас слушай, Роджер приезжает домой завтра.

Следует помнить о том, что в английском языке существуют глаголы, которые не употребляются в Present Continuous:

1) **чувственного восприятия**: feel, look, notice, observe, hear, see, smell, sound, taste;

2) **умственной деятельности**: advise, believe, consider, doubt, forget, guess, hope, imagine, insist, know, mean, promise, realize, recognize, recommend, regret, remember, require, seem, suggest, suppose, suspect, think, understand, wonder;

3) **чувств**: admire, envy, adore, astonish, concern, despise, detest, dislike, hate, impress, like, love, surprise;

4) **желания**: desire, lack, need, please, prefer, satisfy, want, wish;

5) **принадлежности**: belong, consist, contain, depend, have, include, involve, keep owe, own, possess;

6) **некоторые другие глаголы**: agree, apologize, appear, cost, deny, deserve, equal, exist, fit, forgive, impress, lack, last, look like, matter, reach, refuse, remain, resemble, stop, suit, survive.

Exercise 3. Transform the following verbs into the Participle I. Translate them into Russian.

Read, write, take, sit, play, look, swim, jump, run, go, do, buy, help, eat, clean, make, speak, sleep, listen, talk, fly, lie, die, come, shop, live, sing.

Exercise 4. Translate the following sentences into Russian.

1. I'm playing tennis with my friend next Friday. 2. We are walking on the beach now. 3. They are having a great time at the camp at the moment. 4. Is Angela painting a beautiful picture now? 5. What hotel are Tina and Pam staying today? 6. It is raining outdoors nowadays, isn't it? 7. Where is Bobby preparing for the test now? 8. The dog is still barking at some strangers. 9. The water in the kettle is not boiling, is it? 10. Somebody is knocking at the door right now. 11. The children are still sleeping.

Exercise 5. Put the verbs in brackets in the Present Continuous.

1. Be quiet! Mum (sleep). 2. What you (do) now? 3. The dog (play) with a ball. 4. I (not sleep) at present. I (listen) to music. 5. The children (drink) milk in the kitchen. 6. He (have) a bath. 7. Why you (laugh)? 8. His dad and brother (cycle) to the shops. 9. We (not travel) in Japan. 10. I (sunbathe) on the beach. 11. She (not watch) TV. 12. They (not swim) in the sea. 13. Sue (stay) at home today. 14. I (watch) a reality show on TV.

Exercise 6. Use the Present Indefinite or Present Continuous.

1. Vegetarians are people who (don't eat/aren't eating) meat. 2. Look out! My brother (comes/is coming). 3. Some people still think the Sun (goes/is going) round the Earth. 4. What (happens/is happening) in golf if you lose the ball? 5. I (play/am playing) tennis at present. 6. Look! She (wears/is wearing) the same shoes as me. 7. What (are you looking/do you look) at? – A strange bird. 8. I (stay/am staying) with John for a few weeks until my flat is ready. 9. At the moment we (stay/are staying) with Peggy. 10. The boys (are studying/study) still the chassis.

**The Modal Verb *Have To*
(Модальный глагол *have to*)**

Модальный глагол **have to** – *должен, придется, вынужден* – выражает *необходимость* совершения действия, вызванную обстоятель-

ствами. По смыслу близок модальному **must** (обязанность или необходимость с точки зрения говорящего).

В этом значении он может употребляться во всех формах и временах, в предложениях любых типов в сочетании с простым инфинитивом с частицей **to**. Он имеет формы времени: **have / has to** – настоящее время, **had to** – прошедшее время, **shall / will have to** – будущее время.

I We You They He / She It	have has had shall have will have	to control the equipment.		
Do Does Did Shall Will	I we you they he /she /it	have	to prepare home task?	
I We You They He / She It	do does did shall will	(not)	have	to leave the classroom.

Модальный глагол **have to** употребляется в предложении:

1) для выражения *обязанности, в определенном случае наступающей извне*:

You *have to* work hard if you want to succeed. – Ты *должен работать* много, если хочешь достичь цели;

2) для выражения *обязанности или необходимости, вызванной законом, правилом или властью конкретного человека*:

Children *have to* go to school when they are 7 (закон). – Дети *должны* идти в школу с семи лет.

Mum says that you *have to be* at home at 9.00 p.m. (*приказ матери*). – Мама говорит, что ты *должен быть* дома в девять часов вечера;

3) для выражения *обычной повторяющейся обязанности*:

I *have* always *to tell* my parents where I am going. – Я *всегда должен говорить* моим родителям, куда я иду;

4) модальный глагол **have to** может выступать в качестве *безлично-го* глагола:

People all over the world *have to learn* English. – Люди во всем мире *должны изучать* английский язык;

5) для указания на *отсутствие необходимости* в отрицательных предложениях:

You *don't have to go* there. (Вам *не нужно* (нет необходимости) *идти* туда).

Exercise 7. Translate the following sentences into Russian.

1. I have to wash the dishes. 2. We don't have to set the table. 3. He will have to make lunch. 4. She had to cut the grass. 5. Do they have to put away their things? 6. Did I have to help my friend? 7. Will she have to wash the dishes? 8. Does he have to cook supper? 9. They have to come to school on Sunday. 10. We shall have to work at night, shan't we? 11. Mary has to go to work by train, doesn't she? 12. Tom and Nick didn't have to get up early, did they? 13. Emily had to prepare the documents for Monday, didn't she?

Exercise 8. Make the right choice.

1. My parents *have / has* to wear a uniform at work. 2. I *don't / doesn't* have to wash the dishes after lunch. 3. Lily *didn't / doesn't* have to go shopping yesterday. 4. Jon *will have / has* to go to work next week. 5. We *don't / won't* have to get up early on Sundays. 6. Leo *have / had* to read a lot of books last month. 7. I *had to / has* to take out the garbage on Mondays.

Exercise 9. Use the correct form of the modal verb *have to*.

1. You (not run). You won't miss the bus. 2. Pete's eyes are very bad, and he (wear) glasses. 3. School starts at eight o'clock, so we (get) up early. 4. My friend gave me some tickets for the concert, so I (not pay)! 5. We (study) maths, because it's compulsory. 6. She's got lots of time. She (not hurry). 7. We (not take) any exams at the end of this term. 8. My mum sometimes (work) at weekends. 9. Tom (wash) the dishes yesterday. 10. I (not, go) to school. I study at home. 11. We (tell) her the truth tomorrow.

The Indefinite Pronouns *Some, Any, No* (Неопределенные местоимения *some, any, no*)

1) Неопределенное местоимение **some** употребляется в утвердительных предложениях перед исчисляемыми существительными во множественном числе в значении *некоторые, какие-то, несколько* и перед неисчисляемыми существительными в значении *немного*, например:

I have *some* pens. – У меня есть *несколько* ручек.

I have *some* coffee. – У меня есть *немного* кофе.

2) Неопределенное местоимение **any** употребляется в отрицательных предложениях перед всеми видами существительных в значении *никакой, никакие*, например:

Tom *does not* read *any* book. – Том не читает *никакую* книгу.

Peter *does not* repair *any* engines. – Питер не ремонтирует *никакие* двигатели.

Nick *does not* drink *any* coffee. – Ник не пьет *никакой* кофе.

2.1) Неопределенное местоимение **any** употребляется в вопросительных предложениях перед всеми видами существительных в значении *какой-нибудь, какие-нибудь*, например:

Did you see *any* film yesterday? – Ты видел *какой-нибудь* фильм вчера?

Are there *any* cars in the street? – Есть *какие-нибудь* автомобили на улице?

Have they got *any* tea? – У них есть *какой-нибудь* чай?

2.2) Неопределенное местоимение **any** употребляется в утвердительных предложениях в значении *любой*:

Any boy can run fast. – *Любой* мальчик может бегать быстро.

You can read *any* newspapers. – Ты можешь читать *любые* газеты.

3) Неопределенное местоимение **no**, находясь в предложении, делает его отрицательным, глагол-сказуемое употребляется в утвердительной форме, но при этом на русский язык переводится в отрицательной форме. Данное местоимение употребляется перед всеми видами существительных, причем неопределенный артикль перед исчисляемым существительным в единственном числе не употребляется, например:

They have *no* water. У них *нет* воды.

Mike made *no* mistakes. Майк не сделал *ни одной* ошибки.

Sue has got *no pencil*. – У Сью *нет* карандаша.

Exercise 10. Translate the following sentences into Russian.

1. There is some tea in the glass, but it is very hot. 2. There is no fresh milk in the fridge. I can't make porridge. 3. Are there any tasty apples in the bag? 4. There isn't any jam on the round plate. 5. There are some bananas on the table. They are yellow. 6. There is no butter on the plate. 7. There is no cheese on the table, but there're some cheese sandwiches. 8. There isn't any sausage on the table. 9. There are some potatoes in the bag.

Exercise 11. Use *some, any* or *no*.

1. What job would you like to have? – ... would be good. 2. There is ... cake left on the table. 3. Have you seen ... interesting film recently? 4. With that card you can visit ... cinema you prefer. 5. Would you like ... sugar in your tea? 6. Could you bring ... napkins, please? 7. It is Friday. I am going out with ... of my friends. 8. You will be able to buy a new shirt in ... shop. 9. My dad is busy now. He's got ... work to do. 10. There are ... people in the park because it is cold. 11. Sue didn't buy ... books.

Exercise 12. Read and memorize the following words and word combinations.

balance ['bæləns] – компенсировать
bore [bɔ:] – *гл.* бурить; *сущ.* горная выработка
breakthrough ['breikθru:] – *прил.* прорывной, беспрецедентный
cross section [krɒs 'sekʃən] – поперечное сечение
cut-and-cover tunnel [kʌt-ənd-'kʌvə 'tʌnəl] – туннель, сооружённый открытым способом
cut-and-cover [kʌt ənd 'kʌvə] – открытый способ проходки туннеля
cutter head ['kʌtə hed] – режущая головка
decompression chamber [,di:kəm'preʃn 'tʃeɪmbə] – декомпрессионная камера
deep-level tunnel [di:p-levl 'tʌnəl] – туннель глубокого заложения
earth-pressure balance machine [ɜ:θ-'preʃə 'bæləns mə'ʃi:n] – туннелепроходческий комплекс с компенсацией давления горных пород
excavation [,ekska'veɪʃən] – выемка породы
geological stress [dʒiə'lɒdʒɪkəl stres] – геологическое напряжение
geotechnical [dʒi:əu'teknikəl] – геотехнический
heavily ['hevɪli] – весьма, очень, в большой степени
hemisphere ['hemɪsfɪə] – полушарие
hydraulic jack [haɪ'drɒ:lɪk dʒæk] – гидравлический домкрат
intermediate [,ɪntə'mi:diət] – средний; занимающий промежуточное положение
load-bearing ring [ləʊd-'beəriŋ riŋ] – несущее кольцо
pipejacking [paɪp'dʒækɪŋ] – задавливание туннельных конструкций
pressurize ['preʃəraɪz] – создавать давление
roof over [ru:f 'əʊvə] – покрывать
shallow tunnel ['ʃæləʊ 'tʌnəl] – туннель мелкого заложения
supporting beam [sə'pɔ:tiŋ bi:m] – опорная балка
trench [trentʃ] – котлован, выемка
tunnel-boring machine ['tʌnəl 'bɔ:riŋ mə'ʃi:n] – туннелепроходческий комплекс

tunneling shield ['tʌnəlɪŋ ʃi:ld] – механизированный проходческий
туннельный щит

water table ['wɔ:tə 'teɪbl] – горизонт грунтовых вод

Exercise 13. Read and translate the following text.

Tunnels are dug in various types of materials, from soft clays to hard rocks, and the method of excavation heavily depends on the ground conditions.

Cut-and-cover tunnel. **Cut-and-cover** is a simple method of construction for **shallow tunnels** where a **trench** is excavated and **roofed over**. Strong **supporting beams** are necessary to avoid the danger of the tunnel collapsing. Shallow tunnels are often of the cut-and-cover type (if under water), while **deep-level tunnels** are excavated, often using a **tunneling shield**. For **intermediate** levels, both methods are possible. **Tunnel-boring machines** (TBMs) can be used to automate the entire tunneling process. There are a variety of TBMs that can operate in a variety of conditions.

One type of TBM, called an **earth-pressure balance machine**, can be used deep below the **water table**. This **pressurizes** the **cutter head** with air or another fluid in order to **balance** the water pressure. As a result operators of the TBM must go through **decompression chambers**, much like divers. Until recently the biggest TBM built was used to **bore** the Green Heart Tunnel in Denmark. Its diameter is 14.87 meters. Currently there are four even larger machines: two for the M30 ring-road in Madrid, Spain; two for the Chong Ming tunnels in Shanghai, China. These machines are 15.2 meters and 15.4 meters in diameter, respectively.

The *New Austrian Tunneling Method* (NATM) was developed in the 1960s. The main idea of this method is to use the **geological stress** of the surrounding rock mass to stabilize the tunnel itself. Based on **geotechnical** measurements, an optimal **cross section** is computed. The excavation is immediately protected by thin shotcrete, just behind the **excavation**. This creates a natural **load-bearing ring**, which minimizes the rock's deformation. In the last decades also soft ground excavations up to 10 kilometers became more common.

Pipejacking is a method of tunnel construction where **hydraulic jacks** are used to push specially made pipes through the ground. This method is commonly used to create tunnels under existing structures, such as roads or railways. Tunnels constructed by pipe jacking are normally small diameter **bores** with a maximum size of around 3.2 metres. The twenty-first century is likely to see the arrival of tunnels connecting continents: the Strait of Gibraltar tunnel connecting Western Europe and Africa and the Bering Strait tunnel connecting Asia and North America. The Bering Strait tunnel project

will require **breakthrough** levels of peaceful cooperation between key countries in order to realize the huge potential of economic benefits by linking the two **hemispheres**. Constructing the Bering Strait tunnel will require that it be connected by proper railways and roads to existing transportation infrastructure in Asia and North America. Planning for the Bering Strait project is underway by groups in Russia, the U.S. and Korea.

Exercise 14. Read the text and insert the necessary propositions.

1. Tunnels are dug ... various types ... materials; 2. Simple method ... construction ... shallow tunnels; 3. Danger ... the tunnel collapsing; 4. Operate ... a variety ... conditions; 5. Go ... decompression chambers; 6. Machines are 15.2 meters ... diameter; 7. Main idea ... this method; 8. excavations up ... 10 kilometers; 9. Tunnels ... existing structures; 10. Bores ... a maximum size ... around 3.2 metres; 11. Cooperation ... key countries.

Exercise 15. Translate the words and word combination in brackets into English using the text.

1. (Туннелепроходческие комплексы) can be used to automate the entire (процесс прокладки туннеля). 2. This pressurizes the (режущая головка) with air or another fluid in order to (компенсировать давление воды). 3. This creates a (естественное несущее кольцо), which minimizes the (деформация породы). 4. Tunnels constructed by (задавливание туннельных конструкций) are normally (горная выработка небольшого диаметра) with a maximum size of (около 3,2 метра).

Exercise 16. Translate the following words and word combinations into Russian.

Various types of materials; method of excavation; supporting beams; cut-and-cover tunnel; deep-level tunnels; automate; tunneling shield; intermediate levels; tunnel-boring machines; operators of the TBM; optimal cross section; ring-road; bore a tunnel; geotechnical measurements; hydraulic jacks; breakthrough levels; tunnel construction; two hemispheres.

Exercise 17. Make up word combinations using the text and translate them.

- | | |
|---------------|----------------|
| 1. ground | a) table |
| 2. shallow | b) structures |
| 3. water | c) conditions |
| 4. geological | d) size |
| 5. ground | e) cooperation |
| 6. existing | f) tunnels |
| 7. maximum | g) stress |
| 8. peaceful | h) excavations |

Exercise 18. Translate the following words and word combinations into English using the text.

Различные типы материалов; горная выработка; туннель, сооружённый открытым способом; опорные балки; туннель мелкого заложения; средний уровень; туннель глубокого заложения; кольцевая дорога; механизированный проходческий туннельный щит; поперечное сечение; создавать давление; несущее кольцо; выемка породы; гидравлический домкрат; максимальный размер; горизонт грунтовых вод.

Exercise 19. Answer the following questions.

1. Where are the tunnels dug at present?
2. What is a simple method of construction for shallow tunnels?
3. How are the deep-level tunnels excavated?
4. What can tunnel-boring machines (TBMs) be used for?
5. How can earth-pressure balance machines be used to bore below the water table.
6. What is the diameter of Green Heart Tunnel in Denmark?
7. What is the main idea of New Austrian Tunneling Method (NATM)?
8. What do you know about pipejacking as a method of tunnel construction?
9. What is the perspective in the twenty-first century on tunneling?

UNIT 11

Canals

Part I

Словообразование

Приставка **out-**, прибавляемая к глаголам и иногда к существительным, образует слова, указывающие на превосходящий, чрезмерный результат действия, например:

to weight (взвешивать) – to **outweight** (перевешивать).

Exercise 1. Form the new words using the prefix out-. Translate them into Russian.

Model: to class – to **outclass**

To cast, to come, to outpour, to stay, to jump, to eat, to live, to fly.

Приставка **re-**, прибавляемая к глаголам, образуют слова, значения, которых указывают на повтор действия, например:

to consider (рассматривать) – to **reconsider** (пересматривать).

Exercise 2. Form the new words using the prefix *re-*. Translate them into Russian.

Model: to import – to reimport

To arrange, to furnish, to read, to sell, to issue, to make, to appoint.

The Past Continuous Active (Прошедшее продолженное время в активном залоге)

Прошедшее продолженное время в активном залоге (The Past Continuous Active) является сложной видо-временной формой, которая образуется при помощи вспомогательного глагола **to be** в прошедшем времени и причастия настоящего времени (The Participle I) смыслового глагола.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I was working	I was not working	Was I working?
He was working	He was not working	Was he working?
She was working	She was not working	Was she working?
It was working	It was not working	Was it working?
We were working	We were not working	Were we working?
You were working	You were not working	Were you working?
They were working	They were not working	Were they working?

Прошедшее продолженное время в активном залоге (The Past Continuous Active) используется для выражения действия, происходившего или длившегося в определенный момент в прошлом. Этот момент в прошлом может быть выражен:

1) точным указанием *времени*, например:

I **was reading** a book at 5 o'clock yesterday. – Я *читал* книгу в *пять часов* вчера;

2) точным указанием *отрезка времени*, например:

Victor **was working** in the garden from 4 to 7 o'clock yesterday. – Виктор *работал* в саду с 4 до 7 часов вчера;

3) другим *действием*, выраженным глаголом в Past Indefinite, например:

It **was raining** when I arrived home. – *Шел* дождь, когда я *приехал* домой;

4) *параллельным действием*, выраженным глаголом в Past Continuous, например:

While Sally **was cooking**, Mary **was laying** the table. – *В то время* как Салли *готовила* пищу, Мэри *накрывала* на стол;

5) прошедшее продолженное время (Past Continuous Active) используется для описания обстановки, на фоне которой происходили события, например:

It was a warm summer day. The sun *was shining* and the birds *were singing*. – Это был теплый летний день. Солнце *светило* и птицы *пели*.

Прошедшее продолженное время (Past Continuous Active) часто используется в предложениях вместе с такими обстоятельствами времени, как **at 9 o'clock yesterday** – в 9 часов вечера, **all day long** – весь день, **all the time** – все время, **the whole evening** – весь вечер, **from 3 to 7** – от 3 до 7 часов, **this time last month** – в это время в прошлом месяце, **when** – когда, **while** – в то время как, **when he came** – когда он пришел, **as / just as** – когда / в то время как и др.

Exercise 3. Translate the following sentences into Russian.

1. I was going home at 4 o'clock yesterday. 2. Where were you playing basketball from 4 to 6 yesterday? 3. Sue was talking to her friend for forty minutes yesterday. 4. Who was cleaning the floor at 9 on Thursday? 5. Nick was riding his bike all the evening, wasn't he? 6. Sheila and Dora were waiting for a bus while it was raining. 7. Artists were not preparing for the concert all day yesterday. 8. Pupils were not learning the poem for an hour, were they? 9. Dick was painting the walls in the room while Mary was washing the window. 10. Eve and Tony were skating when John joined them. 11. Pat was travelling in Africa this time last month.

Exercise 4. Put the verbs in brackets in the Past Continuous.

1. When I came, Tom (sit) in the armchair and (read) a book. 2. The teacher met Kate when she (go) to a shop. 3. He couldn't speak because he (die) of laugh. 4. What you (do) from 2 to 5 the day before yesterday? I phoned you several times. – I (listen) to music. 5. When I looked out of the window that afternoon, the sun (shine) brightly, the birds (sing) and the wind (blow). 6. When you called me yesterday, I (take) a shower.

Exercise 5. Make the right choice.

1. David (*came / was coming*) in when the children (*wrote / were writing*) a test. 2. Mike (*phoned / was phoning*) me when I (*took / was taking*) a shower. 3. Mike (*spoke / was speaking*) to me when his little sister (*took / was taking*) his book out of his schoolbag. 4. We (*met / were meeting*) them when we (*stood / were standing*) at the bus stop. 5. I (*slept I was sleeping*) when his mother (*came / was coming*) back. 6. On Monday Mary (*cooked / was cooking*) lunch when the postman (*brought/ was bringing*) her a letter from her friend. 7. When the teacher (*came / was coming*) into the classroom, the children (*sat / were sitting*) at their desks.

The Derivative Pronouns of *Some, Any, No* (Производные местоимения от *some, any, no*)

Местоимения ***some, any, no*** со словами ***thing, body*** и ***one*** образуют сложные местоимения: ***something, somebody, someone, anything, anybody, anyone, nothing, nobody, no one***.

1) Местоимение ***something*** употребляется в утвердительных предложениях в качестве подлежащего в значении *что-то*, при этом сказуемое должно употребляться в форме 3-го лица единственного числа:

Something is wrong here. – Что-то здесь не так.

1.1) Местоимение ***something*** употребляется в утвердительных предложениях в качестве дополнения в значении *что-то*:

John saw *something* in the dark. – Джон увидел *что-то* в темноте.

1.2) Местоимение ***anything*** употребляется в отрицательных предложениях в значении *ничего*, в вопросительных предложениях в значении *что-нибудь* и в утвердительных предложениях в значении *всё*:

I did not see *anything* there. – Я *ничего* там не видел.

Did you do *anything* yesterday? – Ты делал *что-нибудь* вчера?

She cooks *anything* she wants. – Она готовит *все*, что хочет.

2) Местоимение ***somebody*** употребляется в утвердительных предложениях в качестве подлежащего в значении *кто-то*, при этом сказуемое должно употребляться в форме 3-го лица единственного числа:

Somebody comes here. – *Кто-то* идет сюда.

2.1) Местоимение ***somebody*** употребляется в утвердительных предложениях в качестве дополнения в значении *кто-то*:

Bob saw *somebody* in the forest. – Боб увидел *кого-то* в лесу.

2.2) Местоимение ***anybody*** употребляется в отрицательных предложениях в значении *никто, никого*, в вопросительных предложениях в значении *кто-нибудь* и в утвердительных предложениях в значении *все*:

He did not phone *anybody* last Saturday. – Он *никому* не звонил в субботу.

Did you show *anybody* that road? – Ты показывал *кому-нибудь* ту дорогу?

Maggie helps *anybody* she is asked to. – Мэгги помогает *всем*, кто ее попросит.

3) Отрицательное местоимение ***nothing*** употребляется в качестве подлежащего в значении *ничто, ничего*, при этом сказуемое должно употребляться в утвердительной форме в 3-м лице единственного числа, а переводиться на русский язык в отрицательной:

Nothing changes here. – *Ничего* не меняется здесь.

3.1) Отрицательное местоимение **nothing** употребляется в предложениях в качестве дополнения в значении *ничто, ничего*. Сказуемое должно употребляться в утвердительной форме, а переводиться на русский язык в отрицательной:

Drake took *nothing* from the table. – Дрейк *ничего* не брал со стола.

3.2) Отрицательное местоимение **nobody** употребляется в качестве подлежащего в значении *никто*, при этом сказуемое должно употребляться в утвердительной форме в 3-м лице единственного числа, а переводиться на русский язык в отрицательной:

Nobody likes bad weather. – *Никто* не любит плохую погоду.

3.3) Отрицательное местоимение **nobody** употребляется в предложениях в качестве дополнения в значении *никого*. Сказуемое должно употребляться в утвердительной форме, а переводиться на русский язык в отрицательной:

Bill saw *nobody* there. Билл *никого* не видел там.

Exercise 6. Translate the following sentences into Russian.

1. Tom saw something interesting. 2. The engineer gave them some spare parts. 3. Tim will bring something to us. 4. Did Bruce show any photos to Mike? 5. Jorge was reading something. 6. He will write somebody a letter. 7. Peter has nothing in his bag. 8. There are some powerful tractors here. 9. They have some new tasks. 10. We have done nothing to help him. 11. Let me explain something to you. 12. Nobody can give me what I really want. 13. We cannot pretend that nothing has happened.

Exercise 7. Make the right choice.

1. Is there (*something, anything*) interesting in the magazine? 2. They have (*any, no*) old cars. 3. I don't want (*nothing, anything*) today. 4. "I haven't got (*any, no*) instrument," said a repairman. 5. Did you buy (*any, no*) cheese yesterday? 6. I didn't see (*anybody, nobody*) in the street when I went out. 7. We did not harvest (*no, any*) crop because it was raining all day. 8. There is (*anybody, nobody*) at the bus station. 9. How much did you pay for these flowers? – I didn't pay (*nothing, anything*). 10. Have you found (*anything, nothing*)? 11. Is there (*any, some*) salt on the shelf?

Exercise 8. Read and memorize the following words and word combinations.

alluvium-transporting capability [ə'lu:vɪəm-træn'spɔ:tɪŋ,keɪpə'bɪlətɪ] – транспортирующая способность потока по наносам

antiseepage lining [æntɪ'si:pɪdʒ 'laɪnɪŋ] – противофильтрационная облицовка

asphalt-concrete lining ['æsfælt-'kɒŋkri:t 'laɪnɪŋ] – асфальтобетонная облицовка

bed [bed] – дно (*канала*)

bottom ['bɒtəm] – дно, нижняя часть русла

canal [kə'næl] – канал (*искусственный*)

carrying capacity ['kæriŋ kə'pæsəti] – пропускная способность

clear section [kliə 'sekʃən] – свободный участок

concrete slab ['kɒŋkri:t slæb] – бетонная плита

convey [kən'vei] – переправлять, транспортировать

earthwork ['ɜ:θwɜ:k] – земляное сооружение, земляные работы

film [film] – полимерная плёнка

line [laɪn] – облицовывать

marl [mɑ:l] – мергель

midship section ['mɪdʃɪp 'sekʃən] – миделевое сечение

overgrowth ['əʊvəgrəʊθ] – чрезмерно быстрый рост

permissible [pə'mɪsəbl] – допустимый

polygonal [pə'lɪɡənəl] – многоугольный

rectangular [rek'tæŋɡjələ] – прямоугольный

reinforced-concrete slab [ri:ɪn'fɔ:st-'kɒŋkri:t slæb] – железобетонная

плита

retaining wall [ri'teɪnɪŋ wɔ:l] – подпорная стенка

rock excavation [rɒk ekskə'veɪʃən] – разработка скального грунта

rock fill [rɒk fɪl] – каменная наброска

rock paving [rɒk 'peɪvɪŋ] – каменная кладка

roughness ['rʌfnəs] – неровность

sandstone ['sæn(d)stəʊn] – песчаник

sandy loam ['sændɪ ləʊm] – песчанистый суглинок, супесь

screen [skri:n] – экран (*противофильтрационное сооружение*)

seepage ['si:piʒ] – просачивание

silt deposition [sɪlt ,depə'zɪʃən] – кольматаж

silted [sɪltɪd] – заиленный отлагающимися наносами

silt-free water [sɪlt-fri:'wɔ:tə] – незаиленная вода

slope [sləʊp] – откос

timber-flotation canal ['tɪmbə-fləʊ'teɪʃən kə'næl] – лесосплавный канал

trapezoidal ['træpɪzɔɪdl] – трапециевидный

versatile ['væ:sətəɪl] – многофункциональный, универсальный

water-tightness ['wɔ:tə-'taɪtnəs] – водонепроницаемость

waterway ['wɔ:təweɪ] – водный путь

Exercise 9. Read and translate the following text.

A **canal** in hydraulic engineering is an artificial open **waterway** built in the earth usually used to **convey** water or vessels from one point to another.

The **bed** of the canal is **lined** to protect it against erosion by the current and waves, to reduce water losses from **seepage** into the soil, and to decrease the **roughness** of the **bottom** and **slopes** (to increase the **carrying capacity** of the canal). Lining that serves only to protect the slopes of the canal against erosion is made of **rock paving**, **rock fill**, and laying of **concrete** and **reinforced-concrete slabs**.

Antiseepage lining (screens) is also made of clay, **sandy loam**, and well-decomposed peat. The screens are covered with a layer of sand or gravel to protect them against mechanical damage and the effects of temperature. Concrete, reinforced-concrete, and **asphalt-concrete linings** are the most **versatile**; they provide reliable protection against erosion for the canal bed, ensure its **water-tightness**, increase its carrying capacity and, at the same time, make possible complete mechanization of construction work. In addition to installing lining or screens, **silt deposition**, mechanical packing of the soil, and **films** made of synthetic materials are used to combat seepage in canals.

The **cross section** of a canal depends on the purpose of the canal, the structural features of the ground, and the conditions for **earthwork**. The most common shapes of canal cross sections built in soft soils are **trapezoidal** and **polygonal**. The latter is usually used in building large navigational canals. A **rectangular** profile is advisable when canals are built in **rock excavations**. Sometimes the rectangular cross section in soft soils is reinforced by constructing vertical **retaining walls**.

The dimensions of a canal's cross section are determined by hydraulic calculations for a given water flow and the current velocity that is **permissible** for the particular conditions; for navigation and **timber-flotation canals** the size of ships and rafts that will be passing through must also be taken into account. The ratio between the area of the **clear section** of navigation canals and the area of the **midship section** of the hypothetical ship should not be greater than 4:1 for canals on first-category waterways, 3.5:1 for second-category waterways, and 3:1 for the third and fourth categories. If the ratio is smaller, resistance to the movement of ships increases substantially.

The slope of canal walls is determined by the nature of the soil. Where excavations are very deep, and under difficult geological conditions, the strength of the walls is checked through calculations.

The velocity of water current in canals has maximum and minimum values: the maximum, to avoid erosion of the bed of the canal, and the minimum, so that the bed does not become **silted** or overgrown with vegetation. For example, for canals in soft ground (sand and sandy loam), with a water depth of more than 3 m, current velocities of 0.4–1.5 m/sec present no danger of erosion; in hard rock (**marl** or **sandstones**), the velocities may be 3.1–5.6 m/sec. Formulas based on the principle of the so-called **alluvium-transporting capability** of a current are used to determine **silt-free water** velocities. Minimum canal velocities for preventing **overgrowth** with vegetation are 0.3 m/sec for small canals and 0.5 for large canals.

Exercise 10. Translate the following words and word combinations into English using the text.

Гидротехника; транспортировать воду; потери от просачивания; неровность; пропускная способность; каменная кладка; железобетонная плита; асфальтобетонная облицовка; водонепроницаемость; кольматаж; синтетические материалы; миделевое сечение; транспортирующая способность потока по наносам; подпорные стенки; мергель; незаиленная вода; мягкий грунт; свободный участок; прямоугольный.

Exercise 11. Say whether the following statements are true or false. Correct the false ones using the text.

1. A canal is an artificial open waterway built in the earth. 2. Antiseepage screens are made of different materials. 3. Concrete, reinforced-concrete and asphalt-concrete linings fail to protect canals from erosion. 4. The cross sections of canals are always trapezoidal and polygonal. 5. The strength of the walls is checked through calculations. 6. The velocity of water current in canals has only minimum values.

Exercise 12. Translate the following words and word combinations into Russian.

Bed of the canal; bottom and slopes; carrying capacity of the canal; concrete; reinforced-concrete slabs; antiseepage lining; sandy loam; well-decomposed peat; mechanical damage; asphalt-concrete linings; versatile; reliable protection; complete mechanization; combat seepage in canals; timber-flotation canals; midship section; hypothetical ship; marl; sandstone; alluvium-transporting capability; overgrowth with vegetation.

Exercise 13. Translate the expressions into Russian paying attention to the prepositions.

1. Protect canal **against** erosion **by** the current and waves; 2. Reduce water losses **from** seepage **into** the soil; 3. Screens are covered **with** a layer **of** sand; 4. Complete mechanization **of** construction work; 5. Conditions **for**

earthwork; 6. Films made **of** synthetic materials; 7. Formulas based **on** the principle; 8. Canals **in** soft ground, **with** a water depth **of** more than 3 m.

Exercise 14. Match the English words and their Russian equivalents.

- | | |
|-----------------|----------------|
| 1. vessels | a) свойства |
| 2. erosion | b) надёжный |
| 3. gravel | c) движение |
| 4. temperature | d) скорость |
| 5. reliable | e) судоходный |
| 6. purpose | f) корабль |
| 7. features | g) эрозия |
| 8. navigational | h) назначение |
| 9. movement | i) гравий |
| 10. velocity | n) температура |

Exercise 15. Answer the following questions.

1. What is a canal usually used to? 2. What is a canal lining often made of? 3. Why are concrete, reinforced-concrete and asphalt-concrete linings versatile? 4. What does a cross section of a canal depend on? 5. What are the most common shapes of canal cross sections? 6. What are the dimensions of a canal's cross section determined by? 7. What is the ratio between the area of the clear section of navigation canals and the area of the midship section of the hypothetical ship? 8. What are the water current velocities in canals in soft ground and hard rock?

UNIT 12

Canals

Part II

Словообразование

Приставка **non-**, прибавляемая к существительным и прилагательным, образует слова с противоположным значением, например:
interference (вмешательство) – **non-interference** (невмешательство).

Exercise 1. Form the new words using the prefix *non-*. Translate them into Russian.

Model: activated – non-activated

Addictive, adjacent, commercial, governmental, adult, alcoholic, profit.

Приставка **ultra-**, прибавляемая к прилагательным и существительным, образует слова, значения которых указывают на чрезмерность, необычность или неприемлемость, например:

violet (фиолетовый) – **ultraviolet** (ультрафиолетовый).

Exercise 2. Form the new words using the prefix *ultra-*. Translate them into Russian.

Model: modern – ultramodern

Short, conservative, fashionable, radical, portable, red, reliable, sonic.

The Future Continuous Active

(Будущее продолженное время в активном залоге)

Будущее продолженное время в активном залоге (The Future Continuous Active) является сложной видо-временной формой, которая образуется при помощи вспомогательных глаголов будущего времени **shall** и **will**, вспомогательного глагола **to be** в форме инфинитива и причастия настоящего времени (The Participle I) смыслового глагола.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I shall be working We shall be working He will be working She will be working It will be working You will be working They will be working	I shall not be working We shall not be working He will not be working She will not be working It will not be working You will not be working They will not be working	Shall I be working? Shall we be working? Will he be working? Will she be working? Will it be working? Will you be working? Will they be working?

Будущее продолженное время в активном залоге (The Future Continuous Active) используем для того, чтобы выразить действие, которое будет происходить в определенный момент в будущем.

1) этот момент может быть выражен точным указанием *времени* или *отрезка времени* в будущем, например:

I **shall be reading** a book at 5 o'clock tomorrow. – Я *буду читать* книгу в пять часов завтра.

Tom **will be working** in the field from 8 to 12 tomorrow. – Том *будет работать* в поле с 8 до 12 завтра;

2) будущее продолженное время используется для выражения действий, которые произойдут в результате *подготовительных действий*, *договоренности* или *естественного течения событий*, когда мы уверены, что будет так и никак иначе:

I can ask John to call you. *I'll be seeing* him tomorrow. – Я могу попросить Джона позвонить тебе. Я *увиджусь* с ним завтра.

John and I made a deal. *I will be feeding* his cat next week – Мы с Джоном заключили сделку. Я *буду кормить* его кота на следующей неделе

In a few minutes we *will be landing* at the International Airport. – Через пять минут мы *будем приземляться* в международном аэропорту;

3) будущее продолженное время используется для выражения *запланированных действий* с указанием момента или отрезка времени:

This Saturday he *will be writing an abstract*. – В эту субботу он будет писать реферат.

В примере с Future Continuous говорится о том, что всю субботу он будет писать реферат: акцент делается на длительном действии, которое будет совершаться в будущем в определенный отрезок времени, хотя и не будет происходить непрерывно в течение этого отрезка.

They are moving to Moscow next Monday. – Они переезжают в Москву в следующий понедельник

При помощи Present Continuous сообщается чёткий, уверенный план на ближайшее будущее;

4) будущее продолженное время используется для описания нескольких действий, которые произойдут в будущем:

I'll be writing an essay on Sunday, and my mother will be cleaning the house. – Я буду писать сочинение в воскресенье, а мама будет убирать дом;

5) для описания действий в будущем, прерванных другим действием в будущем. При этом часто будут использоваться союзы: **when, while, as soon as, if**, которые обозначают время или условие. Вместо будущего в придаточном предложении следует употреблять Present Indefinite или Present Continuous:

I will be cooking dinner when you arrive. – Я буду готовить ужин, когда ты приедешь.

If you come home about 2 p.m., they will be having dinner. – Если ты вернешься домой около двух часов дня, они будут ужинать.

While Andrew is reading, Maggie will be watching television. – Пока Эндрю будет читать, Мэгги будет смотреть телевизор;

6) будущее продолженное время используется для того, чтобы аккуратно и вежливо узнать у собеседника о планах на ближайшее будущее. При помощи такой формы мы можем поинтересоваться, совпадают ли намерения другого человека с нашими желаниями:

Will you be going to a new restaurant with us tonight? – Ты пойдешь с нами в новый ресторан сегодня вечером?

В то время как Future Indefinite звучит как приглашение:

Will you go to a new restaurant with us tonight? – Пойдем с нами в новый ресторан сегодня вечером.

Будущее продолженное время (Future Continuous) часто используется в предложениях вместе с такими обстоятельствами времени, как **at 5 o'clock tomorrow** – в 5 часов завтра, **from 5 to 6 o'clock tomorrow** – завтра с 5 до 6 часов, **at that moment** – в тот момент, **this time tomorrow (next week, next month)** – в это время завтра (на следующей неделе, в будущем месяце), **at 9 o'clock on Monday** – в 9 часов в понедельник, **when he comes** – когда он придёт, **while** – в то время как, **the whole day** – весь день, **at midnight** – в полночь.

Exercise 3. Translate the following sentences into Russian.

1. I shall be repairing my bike at 8 o'clock tomorrow. 2. Tom will be returning from school at that moment. 3. My sister will be writing her homework when you come. 4. If the temperature drops, it will be snowing tomorrow morning. 5. Sandra will be washing up at noon. 6. This time next year my friends will be running their own shop. 7. I will be buttering the bread while you are slicing the cucumbers. 8. What time will your parents be arriving tomorrow? 9. They will be dancing and singing the whole evening tomorrow. 10. What will she be doing from morning till night the day after tomorrow? 11. I'll be preparing for my future exams at 7 p.m. tomorrow. 12. Mark will be playing the violin from 2 till 4 o'clock on Sunday. 13. Will you be using your car this evening? – No, you can take it.

Exercise 4. Put the verbs in brackets in the Future Continuous Active

1. I (do) my homework at 6 o'clock tomorrow. 2. When I come home tomorrow, my family (have) supper. 3. When you come to my place tomorrow, I (to read) your book. 4. Don't come to my place tomorrow, please. I (write) a composition the whole evening. 5. What you (do) at 8 o'clock tomorrow? 6. You (watch) a new film the whole evening tomorrow? 7. Next week at this time she (work) on the project. 8. Are you very busy now? I (call) you later. 9. They (run) in the central park from 9 till 11 tomorrow. 10. I (stay) exactly in this hotel next week. 11. This time next Sunday we (fly) to Hawaii. 12. Steven and Peter (pack) his clothes tonight. 13. The old woman (post) some letters. 14. The children (play) golf. 15. The old man (make) a phone call.

The Construction *To Be Going To* (Оборот *to be going to*)

Оборот **to be going to** образуется глаголом **to go** в форме Present Continuous (**am/is/are going** – *собираться сделать что-либо*) и инфинитивом смыслового глагола с частицей **to**.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I am going to read He is going to read She is going to read It is going to read We are going to read You are going to read They are going to read	I am not going to read He is not going to read She is not going to read It is not going to read We are not going to read You are not going to read They are not going to read	Am I going to read? Is he going to read? Is she going to read? Is it going to read? Are we going to read? Are you going to read? Are they going to read?

Оборот **to be going to** используется для:

1) выражения *намерения совершить действие или уверенности* в его совершении в будущем, например:

I *am going to* send him a telegram. – Я *собираюсь* послать ему телеграмму;

2) для выражения *большой вероятности* совершения действий в будущем, так как их признаки *очевидны* в настоящем, например:

Look at the clouds! It's *going to* rain. – Посмотри на облака! *Пойдет* дождь.

Exercise 5. Use construction *to be going to*.

1. I ... (move) to Liverpool. 2. Tom ... (fly) to Mars. 3. Victoria ... (marry) at 27. 4. We ... (have) five children. 5. My sons and daughters ... (become) famous actors. 6. They ... (travel) all over the world soon. 7. We ... (eat) in cafes every day. 8. I ... (open) a diving school in York. 9. She (phone) him tomorrow. 10. That tower (collapse) soon. 11. My friends (arrive) today. 12. We (pay) for her. 13. Mum (see) her dentist on Monday.

The Estimative Quantifiers (Количественные местоимения)

Неисчисляемые существительные	Исчисляемые существительные
a lot of – <i>много</i>	
much – <i>много</i>	many – <i>много</i>
a little – <i>немного</i>	a few – <i>несколько</i>
little – <i>мало</i>	few – <i>мало</i>

К количественным местоимениям относятся **much, many, little, few, a little, a few, a lot of**. Местоимения **many, much, few, little** употребляются главным образом в вопросительных и отрицательных предложениях, например:

Have they **many** friends? – У тебя *много* друзей?

There isn't **much** tea in my cup. – В чашке есть *немного* чая.

В случае употребления **many, much, few, little** в утвердительных предложениях они чаще всего определяются словами **very** (очень), **too** (слишком), **so** (так), **rather** (довольно), **how** (как) например:

There are **so many** people here. – Здесь так *много* людей.

There's **too much** coffee for him. – Для него *слишком много* кофе.

She has **very few** friends here. – У нее здесь *очень мало* друзей.

В утвердительных предложениях, как правило, вместо **many** и **much** употребляются **a lot of (lots of)**:

I have got **a lot of** questions. – У меня есть *много* вопросов.

They have **lots of** friends. – У них *много* друзей.

Употребление **few, little, a few, a little** характерно для официальной речи:

Are there **few or many** people at concert? – На концерте *мало* или *много* людей?

Give me **a little** time, please. – Дай мне *немного* времени, пожалуйста.

В разговорной речи чаще употребляются сочетания **not much, not many, very few, very little**:

I have **not much** food at home. – У меня дома *немного* еды.

There are **not many** interesting newspapers at present. – В настоящее время *не много* интересных газет.

Tom has **very few** new records at home. – У Тома дома *очень мало* новых пластинок.

Сочетание **how many** – *сколько* – употребляется в вопросительных предложениях перед исчисляемыми существительными. Сочетание **how much** – *сколько* – употребляется перед неисчисляемыми именами существительными.

How many lessons have you got today? – *Сколько* уроков у тебя сегодня?

How much sugar is there in my tea? – *Сколько* сахара в моем чае?

Exercise 6. Translate the following sentences into Russian.

1. We don't have much food in the house. 2. We had very little snow last winter. 3. I need so many apples for the pie. 4. How many people are

there in your office? 5. There is too much wine in your glass. 6. She didn't have much luggage. 7. She has a few relatives. 8. Gary had very little time for other things. 9. I have tried diving very many times in my life. 10. John will not have many exams next year. 11. We have a little time before the train leaves. 12. I have a lot of flowers. 13. Did it cost much to repair the car? 14. A lot of people drive too fast. 15. Vicky has very few friends.

Exercise 7. Make the right choice.

1. I don't have *many* / *much* friends. 2. Please, be quick! We have *a little* / *a few* time. 3. There were *much* / *a lot of* sunny days but we did not spend *much* / *many* time on the beach. 4. I will come soon. There is so *little* / *few* work to do. 5. There are *a few* / *a little* roses in the garden. 6. There are *a few* / *a little* windows in my room. 7. Mary has *little* / *a few* dolls because she likes toy cars. 8. He doesn't read *many* / *much* books. 9. You took *a little* / *a few* photos on holiday. 10. There is too *much* / *many* salt in the soup. 11. There are rather *many* / *little* sky-scrapers in our city. 12. I've got *a few* / *a little* albums of this singer. 13. There was very *little* / *many* rain last autumn. 14. How *many* / *much* fish are there in the sea?

Exercise 8. Read and memorize the following words and word combinations.

breeding ground ['bri:diŋ graʊnd] – нерестилище, место нереста
 chamber ['tʃeɪmbə] – камера
 delivery canal [dɪ'lɪvəri kə'næl] – подводный канал
 distribution canal [dɪstrɪ'bju:ʃən kə'næl] – распределительный канал
 diversion canal [daɪ'vɜ:ʃən kə'næl] – отводной канал
 drainage canal ['dreɪnɪdʒ kə'næl] – осушительный (дренажный) канал
 draw off [drɔ: ɔf] – отводить (*воду с помощью канала*)
 estuary ['estuəri] – устье реки; эстуарий, дельта
 ferry crossing ['ferɪ 'krɒsɪŋ] – паромная переправа
 fish-ladder canal ['fɪʃ-'lædə kə'næl] – рыбоводный канал
 float [fləʊt] – сплавлять (*лес*)
 flood gate [flʌd geɪt] – паводковый шлюз
 general-purpose canal [dʒenərəl-'pɜ:pəs kə'næl] – многоцелевой канал
 gravity flow ['grævɪtɪ fləʊ] – течение под действием силы тяжести
 high water divide [haɪ 'wɔ:tə dɪ'vaɪd] – высокий водораздел
 intersect [ɪntə'sekt] – пересекать
 inverted siphon [ɪn'vɜ:tɪd 'saɪfən] – обратный сифон, дюкер
 irrigation canal [ɪrɪ'geɪʃən kə'næl] – оросительный канал
 knickpoint ['nɪk pɔɪnt] – порог, перепад реки
 lock [lɒk] – шлюз (*на реке, на канале*)

lock canal [lɒk kə'næl] – шлюзованный канал
 lumber-flotation canal ['lʌmbə-fləu'teɪʃən kə'næl] – лесосплавный канал
 main canal [meɪn kə'næl] – магистральный канал
 navigation canal [ˌnævɪ'geɪʃən kə'næl] – судоходный канал
 necessitate [nə'sesɪteɪt] – требовать
 open canal ['əʊpən kə'næl] – открытый канал
 overly ['əʊvəli] – чрезмерно
 pipe [paɪp] – трубопровод
 public health regulations ['pʌblɪk helθ ˌregjə'leɪʃən] – санитарные нормы и правила
 pumping station ['pʌmpɪŋ 'steɪʃən] – насосная станция
 race [reɪs] – стремительный поток, быстрое течение
 raft [rɑ:ft] – плот
 reservoir ['rezəvwa:] – водохранилище
 return canal [rɪ'tɜ:n kə'næl] – отводящий канал
 route [ru:t] – прокладывать (*маршрут в определённом направлении*)
 sharp break [ʃɑ:p breɪk] – резкий перепад, излом
 thalweg ['tɑ:lveɡ / 'θɑ:lweɡ] – тальвег, дно речной долины
 transverse dimension [trænz'vɜ:s daɪ'menʃən] – поперечный размер
 viaduct ['vaɪədʌkt] – виадук, путепровод
 water-supply canal ['wɔ:tə-sə'plai kə'næl] – водопроводный канал

Exercise 9. Read and translate the following text.

Canals are generally classified according to purpose as **navigation canals**, **diversion canals**, **irrigation canals**, **water-supply canals**, **drainage canals**, **lumber-flotation canals**, **fish-ladder canals**, and **general-purpose canals**.

Navigation canals are artificial inland waterways for boats, barges, or ships. They are also divided into **open** and **lock canals**. Open canals are built by joining waterways whose water levels are almost the same; canals with **locks** are used when there is a difference in levels or when the route of the canal crosses a **high water divide**. Lock canals usually consist of several sections called **chambers** on different levels and locks are installed between them. The water in navigation canals may move by **gravity flow**, or it may be pumped by **pumping stations**. Navigation canals are characterized by great length and by broad **transverse dimensions**.

Diversion canals take water from a river, **reservoir**, or lake to a hydroelectric power plant or **draw off** water that has passed through the turbine. Such canals are typically very short; **delivery canals** are usually not more than 5–10 km long (maximum of 30 km), and **return canals** are seldom

more than a few kilometers long. The water flow of diversion canals varies; in some cases it is more than 1,000 m³/sec.

Irrigation canals are designed to supply water to irrigated lands. They usually form a system of **main canals, distribution canals**, the irrigation canals themselves and drainage canals. Water enters irrigation canals by gravity flow or is fed by pumps. In large irrigation systems the length of the main canals may be several hundred kilometers.

Water-supply canals deliver water from the source of supply to the place of consumption (an industrial region, city or community). Operating conditions and public health regulations sometimes **necessitate** the water-supply canals to be lined (for example, the canal about 30 km long that delivers water from the Ucha Reservoir to Moscow).

Drainage canals collect water that comes from a drainage network (on swampy or **overly** moist terrain) and conduct it to a river, lake, or sea by gravity flow or through the use of pumping stations. Drainage canals are usually **ruled** along the lowest points of the territory being drained (along **thalwegs**).

Lumber-flotation canals are built to **float** timber (as individual logs or in **rafts**), usually from the place where it is cut to a river that is suitable for flotation or to a sawmill. Flotation canals are also built in the area of hydraulic-engineering complexes to direct floating timber around hydraulic-engineering structures.

Fish-ladder canals supply water to man-made **breeding grounds**, provide a connection between rivers and isolated bodies of water (lakes) in which fish are found, and supply fresh water to **estuaries**.

General-purpose canals are built to accomplish several water-management tasks simultaneously. Such canals have been developed on a particularly large scale in the USSR in connection with multiple use of river resources. For example, the Moscow Canal delivers water for navigation and water supply for the city of Moscow, the Volga-Don Canal (together with the Tsimlyansk Hydroelectric Power Plant) is a navigation-irrigation-water-supply and power complex.

Structures on canals. In addition to special structures related to the operation of canals, such as locks, pumping stations, **flood gates** and many other hydraulic-engineering structures for various purposes are also erected along all canals. Among them are structures in places where the canal **intersects** streams (**pipes, inverted siphons**, and aqueducts), at intersections with transportation routes (**viaducts**, tunnels, bridges, and **ferry crossings**), and in places where there is a **sharp break** in the relief of the terrain (**knickpoints** and **races**).

Exercise 10. Translate the following words and word combinations into English using the text.

Судоходный канал; отводной канал; оросительный канал; лесосплавный канал; рыбоводный канал; шлюзованный канал; высокий водораздел; насосная станция; лодки; баржи; корабли; отводить воду; резкий перепад; дренажная сеть; чрезмерно влажная местность; сплавлять лес; изолированные водоемы; гидротехнические сооружения; трубопроводы; обратный сифон; виадук; туннели; лесопилка.

Exercise 11. Match the words with their definitions.

- | | |
|---------------|--|
| 1. reservoir | a) river, canal, or other route for travel by water. |
| 2. lake | b) a place where walls have been built with gates at each end so that boats can move to a higher or lower section of the canal or river. |
| 3. irrigation | c) the force which causes things to drop to the ground. |
| 4. drainage | d) a natural stream of water flowing in a channel to the sea, a lake or another such stream. |
| 5. gravity | e) a large natural or artificial lake used as a source of water supply. |
| 6. lock | f) a large area of fresh water, surrounded by land. |
| 7. waterway | g) the use of water pumped from boreholes or diverted from rivers to assist agriculture. |
| 8. river | h) the system or process by which water or other liquids are drained from a place. |

Exercise 12. Choose the correct option to complete the sentences.

- Navigation canals are ... inland waterways for boats, barges, or ships.
a) inverted; b) natural; c) artificial.
- The water flow of ... channels varies; in some cases it is more than 1,000 m³/sec.
a) section; b) diversion; c) connection.
- Water enters ... by gravity flow or is fed by pumps.
a) drainage canals; b) fish-ladder canals; c) irrigation canals.
- Water-supply canals deliver water from the source of supply to the place of ...
a) intersection; b) regulation; c) consumption.
- ... canals are built to accomplish several water-management tasks simultaneously.
a) Water-supply; b) General-purpose; c) Fish-ladder.

6. Locks, ..., flood gates and many other hydraulic-engineering structures for various purposes are erected along all canals.

a) pumping stations; b) breeding grounds; c) transverse dimensions.

Exercise 13. Translate the expressions into Russian paying attention to the prepositions.

1. Waterways **for** boats; 2. Navigation canals are divided **into** open and lock canals; 3. There is a difference **in** levels; 4. Lock canals consist **of** several sections; 5. Diversion canals take water **from** a river; 6. To supply water **to** irrigated lands; 7. The length **of** the main canals; 8. To direct floating timber **around** hydraulic-engineering structures; 9. **In** addition **to** special structures; 10. A sharp break **in** the relief **of** the terrain.

Exercise 14. Translate the following words and word combinations into Russian.

Lumber-flotation canals; inland waterways; fish-ladder canals; general-purpose canals; open canals; route of the canal; gravity flow; water passes through the turbine; hydroelectric power plant; industrial region; operating conditions; along thalwegs; individual logs; breeding grounds; main canals; distribution canals; flood gate; navigation-irrigation-water-supply; knick-points and races; transportation routes; aqueduct; ferry crossings.

Exercise 15. Answer the following questions.

1. How are canals generally classified? 2. When are the canals with locks used? 3. What do lock canals usually consist of? 4. What are navigation canals characterized by? 5. Where do diversion canals take water from? 6. Where are irrigation canals designed to supply water to? 7. What system do irrigation canals form? 8. Where do water-supply canals deliver water to? 9. Where do drainage canals collect water from? 10. What is the purpose of general-purpose canals? 11. What hydraulic-engineering structures are also erected along all canals?

UNIT 13

Pumping Stations

Part I

Словообразование

Приставка **extra-**, прибавляемая к прилагательным, образует слова со значением, указывающим на необычность, чрезвычайность нахождения за пределами известного местоположения, например:

ordinary (обычный) – **extraordinary** (выдающийся).

Exercise 1. Form the new words using prefix *extra-*. Translate them into Russian.

Model: atmospheric – extra-atmospheric

Mundane, territorial, tropical, national, constitutional, spectral, sensory.

Приставка **ex-**, прибавляемая к существительным, образует слова со значением «бывший», например:

minister (министр) – **ex-minister** (экс-министр).

Exercise 2. Form the new words using prefix *ex-*. Translate them into Russian.

Model: husband – ex-husband

Offender, champion, president, manager, director, wife, soldier, student.

The Participle II **(Причастие прошедшего времени)**

В английском языке при образовании причастий прошедшего времени (The Participle II) глаголы делятся на две группы: правильные и неправильные.

Правильные глаголы образуют Participle II путем прибавления к форме инфинитива окончания **-ed**. При этом соблюдаются следующие правила орфографии:

а) глаголы, оканчивающиеся в инфинитиве на немое **-e**, теряют эту гласную при прибавлении окончания **-ed**: to live – **lived**;

б) глаголы, оканчивающиеся в инфинитиве на **-y** с предшествующей согласной, меняют **y** на **i**: to study – **studied**.

Если же перед **-y** стоит гласная, то **-y** сохраняется: to play – **played**;

в) если односложный глагол в инфинитиве оканчивается на одну согласную, перед которой стоит одна гласная, то конечная согласная удваивается: to stop – **stopped**;

г) двусложные и многосложные глаголы, оканчивающиеся на одну согласную, перед которой стоит одна гласная, удваивают конечную согласную только в том случае, если ударение падает на последний слог: to equip [ik'wɪp] – **equipped**.

Если глагол оканчивается на **l**, то **l** удваивается независимо от того, падает ли ударение на последний слог или нет: to cancel – **canceled**.

Все неправильные глаголы сведены в таблицу, в которой имеются три колонки: первая – инфинитив, вторая – прошедшее простое время, третья – причастие прошедшего времени (**The Participle II**), и все формы неправильных глаголов необходимо заучивать наизусть.

Третья форма неправильного глагола является формой **Participle II**: to begin – began – **begun**.

The Present Perfect Active (Настоящее совершенное время в активном залоге)

Настоящее совершенное время в активном залоге (The Present Perfect Active) образуется с помощью вспомогательного глагола **to have** в Present Indefinite и причастия прошедшего времени (The Participle II) основного глагола.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I have worked	I have not worked	Have I worked?
We have worked	We have not worked	Have we worked?
You have worked	You have not worked	Have you worked?
They have worked	They have not worked	Have they worked?
He has worked	He has not worked	Has he worked?
She has worked	She has not worked	Has she worked?
It has worked	It has not worked	Has it worked?

1. Настоящее совершенное время в активном залоге (The Present Perfect Active) употребляется для выражения действия, которое *состоялось до момента речи* и имеется в виду результат этого действия, его важность на момент речи. Время действия преимущественно не указывается, так как в центре внимания находится результат действия, а не время когда оно произошло, например:

I have locked the door. – Я *запер* дверь.

You have read more books than me. – Ты *прочел* книг больше, чем я.

2. Настоящее совершенное время употребляется также в предложении с обстоятельствами времени:

а) обозначающими период, который начался в прошлом и длился до момента речи: **up to now, to the present** – *к этому времени*, **lately** – *недавно, в последнее время*, **recently** – *недавно, в последнее время*, **so far** – *до сих пор*, **since** – *с тех пор*, **not yet** – *еще не*:

Up to now we have read three books. – *К этому времени мы прочитали* три книги.

Have you been to the theatre recently? – Ты *был* в театре *недавно*?

You have not shown me your room yet. – Ты *еще не показал* мне свою комнату.

I have done nothing since I left. – Я *ничего не сделал*, *с тех пор как я уехал*.

Have you heard from your friend lately? – Ты *получил* новости от своего друга *в последнее время*?

б) обозначающими период, который еще не закончился, например: **today** – *сегодня*, **this morning** – *сегодня утром*, **this winter** – *этой зимой*, **this week (month, year)** – *на этой неделе (в этом месяце, в этом году)*:

My friends have not arrived *today*. – Мои друзья не приехали *сегодня*.

Have you breakfasted *this morning*? – Ты завтракал *сегодня утром*?

3. Настоящее совершенное время употребляется в предложениях с наречиями неопределенного времени и частотности: **ever** – *когда-либо*, **never** – *никогда*, **often** – *часто*, **seldom** – *редко*, **already** – *уже*, **just** – *только что*:

We have *just* arrived. – Мы *только что* приехали.

Have you *ever* thought about that? – Ты *когда-либо* думал об этом?

I have *often* heard about that. – Я *часто* слышал об этом.

4. Настоящее совершенное время употребляется для выражения действия или состояния, происшедшего с какого-то момента в прошлом вплоть до момента речи. Период продолжительности действия в большинстве случаев обозначается:

а) словосочетанием с предлогом **for** (**for an hour** – *в продолжение часа*, **for ten years** – *на протяжении десяти лет*, **for a long time** – *долгое время*):

I have known Tim *for* 5 years. – Я знаю Тима *уже* пять лет;

б) Слово **since** употребляется в качестве предлога для выражения момента начала действия: **since five o'clock** – *с пяти часов*, **since Monday** – *с понедельника*, в качестве союза: **since I saw him** – *с того момента, как я его видел* и в качестве наречия: **since** – *с тех пор*.

He has worked in a bank *since* winter. – Он работает в банке *с зимы*.

She has held two jobs *since* she graduated. — Она сменила две работы *с тех пор*, как окончила учёбу.

Nobody has seen him *since*. – *С тех пор* его никто не видел.

Exercise 3. Translate the following sentences into Russian.

1. We have just returned from the journey. 2. Have you seen your boss today? 3. My Dad has worked as a builder for three years. 4. I have been to Britain several times since I finished school. 5. She has lived in Spain since 1994. 6. I have spent a lot of money since. 7. Ian and Peter have not repaired the radio, have they? 8. I have never driven a car. 9. We have got some letters this week. 10. The dog has just run away. 11. The weather has changed since the sun rose. 12. Has Nelly typed three letters yet? 13. Max has bought a magazine today, hasn't he?

Exercise 4. Put the infinitives in brackets in the Present Perfect Active.

1. I (be) to their concert twice. Their music is amazing. 2. I (not, see) Jane since the day of her wedding. They (come back) from their honeymoon yet? 3. Where is your ID Card? – I (lose) it. They are going to make me another one. 4. Oh, look! It's Sarah. I (not, see) her for a long time. 5. Jane is on holiday. She (go) to Ireland. 6. Are you going to the medical center? – I (already, be) there today. 7. I am waiting for a very important letter. It (not/to arrive) yet? 8. My father (start) a new job recently. He is very busy now. I (not, talk) to him for a long time already.

Exercise 5. Complete the sentences using the Present Perfect or Past Indefinite.

1. I (know) her for six years. 2. I (know) him when I was at high school. 3. He (live) in Paris from 1997 to 2000. 4. He (live) in New York since 2001. 5. Where's Pete? I (not see) him for ages. 6. I (not see) Pete last night. 7. We (be) at primary school from 1993 to 1998. 8. We (be) in this class since September. 9. I (not watch) this video yet. 10. I (not watch) a video at the weekend. 11. I (never/ be) to the USA. I (want) to go there last summer but I couldn't. 12. He (live) in this street all his life. 13. His father (come back) to London last Sunday. 14. Yan (write) a letter to Nick two days ago.

**The Modal Verb *Be To*
(Модальный глагол *be to*)**

В качестве модального глагола **to be** употребляется в сочетании с инфинитивом с частицей **to** для выражения *необходимости* совершить действие согласно предварительной *договоренности* или *заранее намеченному плану*.

I He/She We You They	am is are (not) was were	to stay there for a few days.
Am Is Are Was Were	I he/she we you they	to make a detailed report?

Глагол **to be** в настоящем времени – **am, is, are** – на русский язык переводится *должен, должны* и выражает необходимость совершения действия в *настоящем* или *будущем*:

They are to begin this work at once. – Они *должны начать* эту работу немедленно.

Глагол **to be** в прошедшем времени – **was, were** – на русский язык переводится *должен был, должны были* и выражает действие, которое должно было совершиться в прошлом, но неизвестно, совершилось ли действие или не совершилось, это становится ясно из всего содержания речи:

I was to send the telegram, but I forgot. – Я *должен* был послать телеграмму, но я забыл.

Was, were в сочетании с инфинитивом в форме **Perfect** выражает действие, которое должно было совершиться в прошлом, но не совершилось:

I was to have finished my work yesterday. – Я должен был закончить свою работу вчера.

Exercise 6. Translate the following sentences into Russian.

1. You are to stay at the table until you finish your lunch. 2. They were to have cooked a pizza but the client changed the order. 3. I was to have come (but I failed to do so) 4. The government was to have reduced inflation. 5. The Prime minister is to visit Canada. 6. When was he to be here? 7. We were to meet Mike near the market. 8. You are not to open the box until Christmas. 9. Who was to have done the shopping? 10. What am I to do when the guests come? 11. The train was to leave at five-fifteen. 12. If we are to get there on time, we must start at once. 13. Children are not to leave the school without their teacher's permission.

Exercise 7. Read and memorize the following words and word combinations.

back pumping system [bæk 'pʌmpɪŋ 'sɪstəm] – система оборотного водоснабжения

control equipment [kən'trəʊl ɪ'kwɪpmənt] – контрольно-измерительная аппаратура

critical ['krɪtɪkəl] – важный, насущный, необходимый

designs [dɪ'zainz] – конструктивные особенности

differentiate [ˌdɪfə'renʃieɪt] – различать

drainage ditch ['dreɪnɪdʒ dɪtʃ] – дренажная канава

electronic speed controller [ˌelek'trɒnɪk spi:d kən'trəʊlə] – электронный регулятор хода

engineer [ˌendʒɪ'nɪə] – *гл.* проектировать, разрабатывать

failure ['feɪljə] – отказ, выход из строя
 fitted ['fɪtɪd] – смонтированный, установленный
 flight [flaɪt] – ряд шлюзов (*на канале*)
 flooding ['flʌdɪŋ] – затопление, наводнение; прилив
 glass-reinforced plastic [ˌɡlɑːs-ˌrɪːnˈfɔːs ˈplæstɪk] – стеклопластик
 gravitational challenges [ˌɡrævɪˈteɪʃənəl ˈʃælɪndʒɪz] – гравитационные
 ограничения
 gravity drainage ['ɡrævɪtɪ ˈdreɪnɪdʒ] – самотёчный дренаж
 ground [graʊnd] – участок, площадка
 guide-rail / auto-coupling / pedestal system [ɡaɪd-reɪ / ˈɔːtəʊ ˈkʌplɪŋ /
 ˈpedɪstəl ˈsɪstəm] – система направляющих / автоматических трубных
 муфт / опор
 handle sewage ['hændl ˈs(j)uːɪdʒ] – перекачивать бытовые стоки
 high service pumping [haɪ ˈsɜːvɪs ˈpʌmpɪŋ] – перекачка воды под вы-
 соким напором
 high-level alarm indication [haɪ-levl əˈlɑːm ˌɪndɪˈkeɪʃən] – индикация
 аварийного сигнала высокого уровня
 impact-resistant [ɪmpækt-rɪˈzɪstənt] – ударопрочный
 leakage ['liːkɪdʒ] – просачивание, течь; утечка
 lock [lɒk] – шлюз (*на реке, на канале*)
 lock gate [lɒk ɡeɪt] – ворота судоходного шлюза
 lock usage [lɒk ˈjuːsɪdʒ] – использование шлюза
 low-lying land [ləʊ ˈlaɪŋ lænd] – низина
 maintenance ['meɪntənəns] – техническое обслуживание и (*текущий*)
 ремонт
 managing ['mænɪdʒɪŋ] – регулирование, управление
 monitoring capabilities [ˌmɒnɪtərɪŋ ˌkeɪpəˈbɪlətɪz] – возможности мони-
 торинга
 navigability [ˌnævɪgəˈbɪlətɪ] – судоходные условия
 overflow ['əʊvəfləʊ] – наводнение, подъём воды
 package pumping stations ['pækɪdʒ ˈpʌmpɪŋ ˈsteɪʃənz] – комплектные
 насосные станции
 pipework ['paɪpwɜːk] – система трубопроводов
 polyethylene [ˌpɒlɪˈeθɪliːn] – полиэтилен
 pre-assembled [priː-əˈsembld] – предварительно собранный
 precast concrete [ˌpriːˈkɑːst ˈkɒŋkriːt] – сборный железобетон
 processing site ['prəʊsesɪŋ saɪt] – место переработки
 public utility building [ˈpʌblɪk juːˈtɪlɪtɪ ˈbɪldɪŋ] – здание коммунально-
 го хозяйства

pumped-storage hydroelectricity installation [ˈpʌmpt-stɔːrɪdʒ haɪdrəʊˈlektɪsɪtɪ ˌɪnstəˈleɪʃən] – гидроаккумулирующая электростанция
 pumphouse [ˈpʌmphaʊs] – насосная станция
 pumping station [ˈpʌmpɪŋ ˈsteɪʃən] – насосная станция
 raw water [rɔː ˈwɔːtə] – неочищенная вода
 removal [rɪˈmuːvəl] – демонтаж, извлечение, съём
 replenish [rɪˈplenɪʃ] – пополнять, наполнять вновь; доливать
 sourcing from well [sɔːsɪŋ frɒm wel] – забор (воды) из скважины
 submersible pump station [səbˈmɜːsəbl ˈpʌmp ˈsteɪʃən] – насосная станция погружного типа
 vessel [ˈvesəl] – корабль, судно
 wastewater [ˈweɪstwɔːtə] – сточная вода
 wastewater pumping station [ˈweɪstwɔːtə ˈpʌmpɪŋ ˈsteɪʃən] – насосная станция бытовых отходов
 water supply [ˈwɔːtə səˈplaɪ] – водоснабжение
 watertight [ˈwɔːtətaɪt] – водонепроницаемый; герметичный

Exercise 8. Read and translate the following text.

Pumping stations, also called **pumphouses**, are **public utility buildings** containing pumps and equipment for pumping fluids from one place to another. They are **critical** in a variety of infrastructure systems, such as **water supply**, drainage of low-lying land, canals and removal of sewage to **processing sites**. A pumping station is an integral part of a **pumped-storage hydroelectricity installation**.

Pumping stations are designed to move water or sewage from one location to another, overcoming **gravitational challenges**, and are essential for maintaining navigable canal levels, supplying water, and **managing** floodwaters. In canal systems, pumping stations help **replenish** water lost through **lock usage** and **leakage**, ensuring **navigability**. Similarly, in land drainage, stations pump water to prevent **flooding** in areas below sea level. The introduction of “**package pumping stations**” has modernized drainage systems, allowing a compact, efficient solution for areas where **gravity drainage** is impractical.

Water pumping stations are **differentiated** by their applications, such as **sourcing from wells**, **raw water** pumping, and **high service pumping**, each designed to meet specific demand and customer needs. **Wastewater pumping stations** are **engineered** to **handle sewage**, with **designs** that ensure reliability and safety, minimizing environmental impacts from **overflows**. Innovations in pump technology and station design have led to the development of **submersible pump stations**, which are more compact and

safer. **Electronic speed controllers** have enhanced the efficiency and **monitoring capabilities** of pumping stations, essential for modern systems.

In countries with canal systems, pumping stations are also frequent. Because of the way the system of canal **locks** work, water is lost from the upper part of a canal each time a **vessel** passes through. Also, most **lock gates** are not **watertight**, so some water leaks from the higher levels of the canal to those lower down. The water has to be replaced or eventually the upper levels of the canal would not hold enough water to be navigable. Where no external water supply is available, **back pumping systems** may be employed. Water is extracted from the canal below the lowest lock of a **flight** and is pumped back to the top of the flight, ready for the next boat to pass through. Such installations are usually small.

When low-lying areas of land are drained, the general method is to dig **drainage ditches**. However, if the area is below sea level then it is necessary to pump the water upwards into water canals that finally drain into the sea. Elsewhere, pumping stations are used to remove water that has found its way into low-lying areas as a result of leakage or flooding.

In more recent times, a “package pumping station” provides an efficient and economical way of installing a drainage system. They are suitable for mechanical collection and pumping of liquids like surface water, **wastewater** from areas where drainage by gravity is not possible. A package pumping station is an integrated system, built in a housing manufactured from strong, **impact-resistant** materials such as **precast concrete**, **polyethylene**, or **glass-reinforced plastic**.

The unit is supplied with internal **pipework fitted**, **pre-assembled** ready for installation into the **ground**, after which the submersible pumps and **control equipment** are fitted. Features may include controls for fully automatic operation; a **high-level alarm indication** in the event of pump **failure**; and possibly a **guide-rail/auto-coupling/pedestal system** to permit easy **removal** of pumps for **maintenance**.

Exercise 9. Translate the words and word combination in brackets into English using the text.

1. А (насосная станция) is an integral part of a (гидроаккумулирующая электростанция). 2. In (системы каналов), pumping stations help replenish water lost through (использование шлюза и просачивание), ensuring navigability. 3. (Электронные регуляторы хода) have enhanced the efficiency and (возможности мониторинга) of pumping stations, essential for modern systems. 4. In more recent times, a “(комплектные насосные станции)” provides an efficient and economical way of installing a (дренажная система).

Exercise 10. Translate the expressions into Russian paying attention to the prepositions.

1. Equipment **for** pumping fluids; 2. Drainage **of** low-lying land; 3. Removal **of** sewage **to** processing sites; 4. Replenish water lost **through** lock usage; 5. Pumping stations are differentiated **by** their applications; 6. Innovations **in** pump technology; 7. In countries **with** canal systems; 8. Water is extracted **from** the canal; 9. The area is **below** sea level; 10. Ready **for** installation **into** the ground; 11. Easy removal **of** pumps **for** maintenance.

Exercise 11. Find in B the English equivalents to the Russian words in A.

A	B
1. инфраструктура	a) indication; b) infrastructure; c) feature.
2. судоходный	a) available; b) submersible; c) navigable.
3. решение	a) solution; b) introduction; c) drainage.
4. применение	a) installation; b) innovation; c) application.
5. эффективность	a) reliability; b) efficiency; c) safety.
6. вверх	a) controls; b) liquids; c) upwards.
7. компактный	a) critical; b) compact; c) modern.
8. материал	a) material; b) sewage; c) leakage.

Exercise 12. Translate the following words and word combinations into English using the text.

Насосная станция; здание коммунального хозяйства; водоснабжение; гидроаккумулирующая электростанция; гравитационные ограничения; пополнять водку; предотвратить наводнение; самотёчный дренаж; насосная станция бытовых отходов; насосная станция погружного типа; шлюзы канала; система обратного водоснабжения; дренажные канавы; ударопрочные материалы; полиэтилен; выход из строя насоса; система направляющих/автоматических трубных муфт/опор.

Exercise 13. Translate the following words and word combinations into Russian.

Equipment for pumping fluids; vessel; removal of sewage to processing sites; modernized drainage systems; water pumping stations; specific demand; customer needs; environmental impacts; overflows; upper part of a canal; upper levels of the canal; external water supply; installations; lowest lock of a flight; below sea level; pump the water upwards; remove water; leakage; flooding; drainage by gravity; submersible pumps; easy removal.

Exercise 14. Answer the following questions.

1. What are pumping stations meant for? 2. Are pumping stations critical in a variety of infrastructure systems? 3. How do pumping stations function

in canal systems? 4. Are water pumping stations differentiated by their applications? 5. What have innovations in pump technology and station design led to? 6. How is water extracted from the canal below the lowest lock of a flight? 7. Why is “package pumping station” suitable for mechanical collection and pumping of liquids? 8. What features may submersible pumps include?

UNIT 14

Pumping Stations

Part II

Словообразование

Приставка **pre-**, прибавляемая к глаголам, прилагательным, существительным, образует слова, означающие предшествование чему-нибудь, указывающие на то, что было *перед* или *до* определенных событий, например:

to compute (считать) – to **precompute** (предварительно вычислять);
historic (исторический) – **prehistoric** (доисторический);
payment (платёж) – **prepayment** (предоплата).

Exercise 1. Form the new words using prefix *pre-*. Translate them into Russian.

Model: fabricate – prefabricate

Condition, analysis, define, classical, revolution, elections, aeration, adolescence, war, determine, decode, date, concert.

Приставка **post-**, прибавляемая к глаголам, прилагательным, существительным, образует слова, означающие что-то, что было *после*, следовало *за* чем-то, например:

date (дата) – **postdate** (более поздняя дата);
classical (классический) – **post-classical** (постклассический);
election (выборы) – **post-election** (после выборов).

Exercise 2. Form the new words using prefix *post-*. Translate them into Russian.

Model: war – postwar

Revolutionary, modern, entry, position, normalize, impressionism, glacial, graduate, damage.

The Past Perfect Active (Прошедшее совершенное время в активном залоге)

Прошедшее совершенное время в активном залоге (The Past Perfect Active) образуется с помощью вспомогательного глагола **to have** в Past Indefinite и причастия прошедшего времени (The Participle II) основного глагола.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I had worked	I had not worked	Had I worked?
We had worked	We had not worked	Had we worked?
You had worked	You had not worked	Had you worked?
They had worked	They had not worked	Had they worked?
He had worked	He had not worked	Had he worked?
She had worked	She had not worked	Had she worked?
It had worked	It had not worked	Had it worked?

Прошедшее совершенное время в активном залоге (The Past Perfect Active) употребляется:

1) для выражения действия, которое состоялось ранее другого действия в прошлом, выраженного глаголом в Past Indefinite:

*I told you I **had met** her.* – Я сказал тебе, что я ее *встретил*.

*We arrived at the cinema at 8.00, but the film **had started** at 7.30.* – Мы *приехали* в кинотеатр в 8.00, но фильм *начался* в 7.30;

2) для выражения действий в сложноподчиненных предложениях с союзами **before** – *перед тем как*, **after** – *после того, как*, **when** – *когда*, **as soon as** – *как только*, когда необходимо отметить предшествование одного прошедшего действия другому:

*We got to the station at 8.00, **after** the train **had left**.* – Мы добрались до вокзала в 8.00, *после того как* поезд уехал.

*When I spoke to the woman I realized I **had met** her somewhere before.*
– *Когда я поговорил с женщиной, я понял, что я *встречал* ее где-то раньше.*

***Before** I entered the Institute, I **had left** the school.* – *Перед тем как я поступил в институт, я *закончил* школу.*

***As soon as** she **had arrived** in my new flat, she began to tidy it up.* – Как только она приехала в мою новую квартиру, она начала приводить ее в порядок;

3) для выражения прошедших действий, которые произошли к определенному моменту в прошлом, с помощью предлога **by**;

by 6 o'clock yesterday – к шести часам вчера, **by that time** – к тому времени, **by last week (month, year)** – к прошлой неделе (месяцу, году), **by last summer** – к прошлому лету:

а) момент может быть выражен временем:

By *last Monday* we *had finished* our project. – К *прошлому понедельнику* мы *закончили* наш проект;

б) момент может быть выражен другим действием:

By the moment *we arrived* to the seaside, our friends *had booked* the hotel. – К тому времени, когда мы приехали на море, наши друзья *забронировали* отель.

Exercise 3. Translate the following sentences into Russian.

1. We had returned home by seven o'clock yesterday evening. 2. Sue had passed all the exams by last Tuesday, hadn't she? 3. Builders hadn't finished the work by eight o'clock yesterday, had they? 4. Your sister had told us the news by the time we arrived home. 5. Had you bought the flowers before the party yesterday? – Yes, we had. 6. Had they played tennis before dinner yesterday? – No, they hadn't. 7. The tourists had arrived before supper yesterday. 8. Whom had Robert seen during his last visit to our town? 9. She hadn't moved to a new house by the end of last week. 10. By what time had your grandparents finished their work in the garden yesterday? 11. How many letters had she typed by the end of the day? 12. Clara told us that she had never been to the Pyramids before.

Exercise 4. Put the verbs in brackets in the Past Perfect.

1. He (maintain) row-crop tractors before he entered the agricultural firm. 2. Ralph said that he (buy) his new cotton pickers and harvesters from a local dealer. 3. The combine operator wanted to work individually because he (repair) the harvester alone. 4. Victor did not know who (produce) the first general-purpose tractor. 5. The engineer was informed that the repair workers (adjust) the last maize planter. 6. Suddenly he remembered that he (not, hitch) the equipment for land reclamation. 7. By the time the tractor reached the field, Tom (test) the computerized control system. 8. Before the mechanic arrived at the Agricultural Show, the organizers (prepare) the tractor stand. 9. The designers (prepare) the drawing before the production process started. 10. Tom (bring) all the spare parts before his assistant repaired the steering mechanism.

Exercise 5. Put the verbs in brackets in the Past Indefinite or Past Perfect.

1. Simon (be) very glad to see that his brother (do) the homework. 2. By the time the film (end), she (fall asleep). 3. I really (feel) sick last

night because I (eat) too much raw fish. 4. When Richard (arrive) at the station he (find) that his wife just (leave). 5. First he (make) a toast, then he (sit down) and (drink) a white coffee. 6. Kate (walk) home because she (miss) the last bus. 7. By the time we (get) to Brazil, we already (spend) all our money. 8. I (decide) to become a fireman by the time I (be) eight. 9. She (sign) the contract before we (come). 10. I (phone) my son and (say) that Bob (see) him in the pub. 11. It (stop) raining by the time they (go).

Exercise 6. Choose the correct answers.

1. I *didn't recognise* / *hadn't recognised* Sue, because she *cut* / *had cut* her hair. 2. I *arrived* / *had arrived* at the shop at 6.45, but it already *closed* / *had already closed*. 3. David *didn't play* / *hadn't played* the match because he *hurt* / *had hurt* his leg. 4. When I *looked* / *had looked* everywhere for my car keys, I *started* / *had started* to panic. 5. When he *had finished* / *finished* his dinner he *sat down* / *had sat down* to watch TV. 6. It *was* / *had been* a film I *didn't see* / *hadn't seen* before.

Exercise 7. Read and memorize the following words and word combinations.

application [ˌæplɪˈkeɪʃən] – применение, использование
 arrangement [ə'reɪndʒmənt] – расположение
 assembly [ə'sembli] – агрегат, сборная конструкция
 casing ['keɪsɪŋ] – корпус
 cater ['keɪtə] – удовлетворять
 centrifugal pump [ˌsentriˈfjuːɡəl ɹʌmp] – центробежный насос
 circumferential [səˌklʌmfə'reɪʃəl] – относящийся к окружности; периферический
 configure [kənˈfɪɡə] – компоновать
 cost-effectiveness ['kɒst-ɪˌfektɪv nəʃ] – рентабельность
 cumbersome ['kʌmbəsəm] – громоздкий, объёмный
 discharge ['dɪsʃɑːdʒ] – нагнетание
 doughnut-shaped diffuser ['dəʊnʌt-ʃeɪpt dɪˈfjuːzə] – тороидальный диффузор
 end-suction and split-case centrifugal pump [end-ˈsʌkʃən ənd splɪt-keɪs ˌsentriˈfjuːɡəl ɹʌmp] – насос центробежный с торцевым всасыванием и разъемным корпусом
 gear system [ɡɪə 'sɪstəm] – зубчатая передача; привод
 gravity manhole ['ɡrævɪtɪ 'mænhəʊl] – смотровой колодец самотечной канализации
 gravity pipeline ['ɡrævɪtɪ 'paɪpleɪn] – самотёчный трубопровод
 impeller blade [ɪmˈpelə bleɪd] – лопасть крыльчатки

instrumentation [ˌɪntstrəmen'teɪʃən] – (контрольно-)измерительные приборы

lift station [lɪft 'steɪʃən] – насосная станция для подъёма сточных вод

impeller [ɪm'pelə] – крыльчатка

outward ['autwəd] – наружу

pit [pɪt] – яма

predetermined [ˌpri:di'tɜ:mɪnd] – предварительно заданный (установленный)

pressurized [preʃəraɪzd] – находящийся под давлением

pump end [pʌmp end] – насосный агрегат

radially ['reɪdiəlɪ] – в радиальном направлении, по радиусу

raw sewage [rɔ: 's(j)u:ɪdʒ] – неочищенные сточные воды

sewage collection system ['s(j)u:ɪdʒ kə'leɪʃən 'sɪstəm] – канализационная система

sewer force main ['səʊə fɔ:s meɪn] – напорный канализационный коллектор

shared baseplate ['ʃeəd ber'sepleɪt] – общая опорная плита

setting ['setɪŋ] – условия, сфера

slope [sləʊp] – 2л. установить с уклоном

suction ['sʌkʃən] – всасывание

suction inlet ['sʌkʃən 'ɪnlet] – всасывающий патрубок

suction pipe ['sʌkʃən paɪp] – всасывающая труба

sump [sʌmp] – сточный колодец

tangentially [tæn'dʒenʃəlɪ] – по касательной

treatment plant ['tri:tment plɑ:nt] – станция очистки сточных вод

versatility [ˌvɜ:sə'tɪlətɪ] – многофункциональность

vertical in-line pump ['vɜ:tɪkəl ɪn laɪn pʌmp] – вертикальный насос с осевым входом

water intake structure ['wɔ:tə 'ɪnteɪk 'strʌktʃə] – водозаборное сооружение

wet well [wet wel] – водоприёмный колодец

Exercise 8. Read and translate the following text.

Pumping stations in **sewage collection systems** are normally designed to handle **raw sewage** that is fed from underground **gravity pipelines** (pipes that are **sloped** so that a liquid can flow in one direction under gravity). Sewage is fed into and stored in a **pit**, commonly known as a **wet well**. The well is equipped with electrical **instrumentation** to detect the level of sewage present. When the sewage level rises to a **predetermined** point, a pump will be started to lift the sewage upward through a **pressurized** pipe system called a **sewer force main** if the sewage is transported some signifi-

cant distance. The pumping station may be called a **lift station** if the pump merely discharges into a nearby **gravity manhole**. From here the cycle starts all over again until the sewage reaches its point of destination – usually a **treatment plant**. Compared to expensive and **cumbersome** gravity systems, the use of pump stations in sewage and wastewater collection offers convenience, cuts construction costs and makes it possible for us to treat and clean water more efficiently.

Regarding the mechanics of water pumping stations, there are a few key components to consider. First, the station needs a **water intake structure** with **suction pipes** for the pumps. From there, the pumps and motor work together to generate the necessary pressure to move the water to its destination. The **gear system** between the motor and pumps is what drives this process. This technology is essential for water management across various **applications**, from sewage and wastewater collection to water distribution systems.

As for water distribution networks, **centrifugal pumps** are the most commonly used type of pump, thanks to their **versatility** and **cost-effectiveness**. Centrifugal pumps are used to transport fluids by the conversion of rotational kinetic energy to the hydrodynamic energy of the fluid flow. The rotational energy typically comes from an engine or electric motor to energy in a moving fluid. A portion of the energy goes into kinetic energy of the fluid. Fluid enters through the **suction inlet**, is caught up in the **impeller blades** and is rotated **tangentially** and **radially outward** until it goes through all **circumferential** parts of the **impeller** into the diffuser area of the casing. The fluid gains both velocity and pressure while passing through the impeller. The **doughnut-shaped diffuser** of the **casing** decelerates the flow and further increases the pressure.

For example, there are horizontal and vertical pumps, each designed to **cater** to different customer requirements. In a horizontal pump installation the pump and motor are positioned on the same horizontal plane. The shaft runs parallel to the ground, and the entire **assembly** is typically mounted on a **shared baseplate** or foundation. This is one of the most common configurations, especially for **end-suction** and **split-case centrifugal pumps** used in industrial and commercial **settings**. While a vertical pump installation features a vertical shaft **arrangement**, with the motor usually mounted directly above the pump end. This design can be **configured** in several ways, such as a **vertical in-line pump** where the **suction** and **discharge** are on the same line, or a submersible pump designed to be fully immersed in the fluid it is moving. These are frequently used in **sumps**, wells, and applications where floor space is limited.

Exercise 9. Read the text and insert the necessary propositions.

1. Liquid can flow ... one direction; 2. Sewage is fed ... and stored ... a pit; 3. Sewage level rises ... a predetermined point; 4. The pump merely discharges ... a nearby gravity manhole; 5. The mechanics ... water pumping stations; 6. Fluid enters ... the suction inlet; 7. Circumferential parts ... the impeller; 8. The shaft runs parallel ... the ground; 9. The gear system ... the motor and pumps; 10. As ... water distribution;

Exercise 10. Translate the following words and word combinations into Russian using the text.

Sewage collection system; wet well; gravity pipelines; pit; instrumentation; sewer force main; lift station; gravity manhole; treatment plant; cumbersome; water intake structure; suction pipes; gear system; centrifugal pumps; versatility; suction inlet; circumferential parts; impeller; doughnut-shaped diffuser; assembly; shared baseplate; end-suction and split-case centrifugal pumps; arrangement; vertical in-line pump; sumps; suction.

Exercise 11. Pick out a word in every sentence that has a corresponding definition.

1. Waste matter such as faeces or dirty water from homes and factories, which flows away through sewers.

- a) liquid; b) gravity; c) sewage.

2. A mechanical device using suction or pressure to raise or move liquids or compress gases.

- a) station; b) pump; c) instrumentation.

3. Something that consists of parts connected together in an ordered way.

- a) plane; b) fluid; c) structure.

4. A machine, especially one powered by electricity or internal combustion.

- a) motor; b) mechanics; c) shaft.

5. The action of sharing something out among a number of recipients

- a) configuration; b) foundation; c) distribution.

6. The rotating part of a centrifugal pump, compressor, or other machine designed to move a fluid by rotation

- a) diffuser; b) impeller; c) sump.

Exercise 12. Translate the following words and word combinations into English using the text.

Перекачка неочищенных сточных вод; самотеком; уровень сточных вод; заранее определенный уровень; система трубопроводов под давлением; удобство; себестоимость строительства; ключевые компонен-

ты; необходимое давление; водопользование; водораспределительные сети; кинетическая энергия вращательного движения; электромотор; корпус; вертикальный насос; горизонтальная плоскость; конструкция.

Exercise 13. Answer the following questions.

1. What are pumping stations in sewage collection systems normally designed to? 2. What usually happens when the sewage level rises to a predetermined point? 3. What convenience does the use of pump stations in sewage and wastewater collection offer? 4. What are the key components in any water pumping stations? 5. What types of pumps are the most commonly used in water distribution networks? 6. What customer requirements can horizontal and vertical pumps cater?

UNIT 15

Navigation Locks

Part I

Словообразование

Суффикс **-ful**, прибавляемый к существительным, а иногда к глаголам, образует прилагательные, указывающее характеристику предмета или на наполненность емкостей:

help (помощь) – **helpful** (полезный);

to forget (забывать) – **forgetful** (забывчивый);

spoon (ложка) – **spoonful** (полная ложка).

Exercise 1. Form the new words using prefix -ful. Translate them into Russian.

Model: beauty – beautiful

Master, watch, fear, pain, basket, pot, spade, glass, hand, room, boat.

Суффикс **-ing**, прибавляемый к существительным и глаголам, образует существительные, обозначающие процесс или материал:

floor (пол) – **flooring** (половые доски);

to translate (переводить) – **translating** (перевод).

Exercise 2. Form the new words using prefix -ing. Translate them into Russian.

Model: to open – opening

To spell, to brush, to draw, to walk, to hear, to cut, to land, to feed.

The Future Perfect Active (Будущее совершенное время в активном залоге)

Будущее совершенное время в активном залоге (The Future Perfect Active) образуется при помощи вспомогательных глаголов будущего времени **shall/will**, вспомогательного глагола **to have** в Present Indefinite и причастия прошедшего времени (The Participle II) основного глагола.

Утвердительная форма	Отрицательная форма	Вопросительная форма
I shall have worked We shall have worked You will have worked They will have worked He will have worked She will have worked It will have worked	I shall not have worked We shall not have worked You will not have worked They will not have worked He will not have worked She will not have worked It will not have worked	Shall I have worked Shall we have worked Will You have worked Will they have worked Will he have worked Will she have worked Will it have worked

Будущее совершенное время в активном залоге (The Future Perfect Active) употребляется для выражения будущего действия, которое завершится до определенного момента в будущем времени. Этот момент может быть указан:

1) такими обстоятельствами, которые указывают на время, к которому действие будет завершено, например: **by 2020** – к 2020 году, **by that time** – к тому времени, **by the end of the week** – к концу недели, **by Monday** – к понедельнику, **by then** – к тому времени, **by tomorrow** – к завтрашнему дню, **until/till** – перед/до (употребляются исключительно в отрицаниях).

By the end of the week I *shall have given up* smoking. – К концу недели я брошу курить.

We *shall have left* this countryside by the end of the year. – Мы уедем из этой деревни к концу года.

By Saturday she *'ll have finished* her project. – К субботе она закончит свой проект.

She *will not have spoken* to him until he calls. – Она не будет разговаривать с ним до тех пор, пока он не позвонит;

2) другим будущим действием в придаточном предложении времени, выраженным глаголом в Present Indefinite. Предполагается, что к началу этого действия действие в главном предложении, выраженное

глаголом в Future Perfect, уже закончится. Как правило, с такими союзами, как **before** – *до того как*, **when** – *когда*, **by the time** – *к тому времени, когда*:

He'll have left our town before I arrive at the station. – Он *уедет* из нашего города до того, как я приеду на вокзал.

We'll have repaired this fridge when you return. – Мы *отремонтируем* этот холодильник, когда ты вернёшься.

By the time you come home, Tom will have prepared dinner. – К тому времени, когда ты придешь домой, Том *приготовит* обед.

Exercise 3. Translate the following sentences.

1. By the next year I'll have started learning French. 2. By the time I'm 25 years old I will have opened a Ballet School. 3. By 2050 I will have travelled the world. 4. By the time I get married I will have graduated from the university. 5. By the end of this year I will have learnt figure-skating. 6. By December I will have visited my aunt in Australia. 7. By next month my friends and I will have visited the Hermitage. 8. By next summer I will have finished my book of poems.

Exercise 4. Put the infinitives in brackets in the Future Perfect.

1. I (live) in London for five and a half years by next September. 2. By Tuesday Jill (read) this story by O'Henry. 3. Next year Fred and Kate (be) happily married for ten years. 4. Molly thinks the film (start) by the time she gets to Fred's. 5. They (fulfill) their plans by then. 6. Before his holiday Tom (spend) all his money. 7. The train (leave) by the time the Nick gets to the station. 8. I (cook) dinner by afternoon. 9. I (finish) my chemistry homework before Jillian comes home. 10. Fernando (have) his operation by next August and should be much fitter. 11. Before Lisa arrives, I (paint) the room. 12. John (translate) this document by 7pm this afternoon. 13. Helen (make) such an attractive doll by her daughter's birthday.

The Modal Verb May Модальный глагол may

Модальный глагол **may** (*мочь, иметь разрешение; возможно, может быть*) имеет основное значение вероятности или разрешения и используется в двух формах: **may** – для использования в настоящем времени и **might** – в прошедшем времени. Для выражения действия в будущем времени вместо глагола **may** используется эквивалент **shall/will be allowed to**.

I We He / She It You They	may may not might might not	go to the automobile show.		
May Might	I we he / she it you they	start the engine of the car?		
I We He / She It You They	shall will	(not)	be allowed	to repair the bicycle.
Shall Will	I we he / she it you they	be	allowed	to adjust the computer?

Модальный глагол **may** чаще всего используется для выражения:

1) *возможности, предположения*, например:

John *may be* at home, or perhaps at work. – Джон, *может быть*, дома или, возможно, на работе.

Might выражает большую степень неуверенности, например:

The weather *might be* better tomorrow. Погода *может быть* лучше завтра, *но вряд ли*;

2) *разрешения*, например:

Johnny, you *may leave* the table when you have finished your dinner. – Ты *сможешь встать* из-за стола только тогда, когда закончишь обедать;

3) *просьбы* для получения разрешения, например:

May I use your bathroom? – *Могу* я воспользоваться твоей ванной?

4) *запрета*, например:

You *may not talk* loudly in libraries. – Нельзя громко разговаривать в библиотеках.

5) модальный глагол **may** в сочетании с инфинитивом в форме Perfect выражает *предположение*, относящееся к прошлому и переводится на русский язык посредством *может быть, возможно*, а инфинитив в форме Perfect – глаголом в прошедшем времени:

He *may have left* Gomel. – Он, может быть (*возможно*), уехать из Гомеля.

Tom *may not have come* yet. – Том, может быть (*возможно*), еще не приехал.

Exercise 5. Translate the following sentences into Russian paying attention to the verb *may*.

1. May I invite Nick to our house? 2. They may travel by sea. It may be cheaper, but it takes a long time. 3. May I shut the window? 4. You may not go to the wood alone, you don't know the way. 5. You might be more polite. 6. He who falls today, may rise tomorrow. 7. Fortune may very well smile upon you one day. 8. I told him that he might go home. 9. John may have gone to the cinema. 10. It might rain, so don't forget your umbrella. 11. Don't drink this water! It might be poisonous. 12. You won't be allowed to talk during your exam tomorrow. 13. Mary may not have bought the dress. 14. It's ten o'clock now. They might have arrived already.

Exercise 6. Read and memorize the following words and word combinations.

axis ['æksɪs] – ось, осевая линия

body of water ['bɒdi əv 'wɔ:tə] – водоём, водный объект

canal lock [kə'næl lɒk] – шлюз (*судоходного*) канала

combined lengths [kəm'baɪnd leŋθs] – суммарная длина

culvert ['kʌlvət] – водопропускная труба; кульверт

emptying ['emptɪŋ] – опорожнение

end [end] – голова (*шлюза*)

filling ['fɪlɪŋ] – наполнение

floor [flɔ:] – днище (*камеры шлюза*)

gates [geɪts] – шлюзные ворота

house [haus] – *зл.* помещать

incorporate [ɪn'kɔ:pəreɪt] – встраивать; включать (*в состав*)

leaves [li:vz] – створки (*дверей*), полотнища (*ворот*)

level difference ['levəl 'dɪfərəns] – перепад высот, разность уровней

lever arm ['li:və a:m] – плечо рычага

lock chamber [lɒk 'tʃeɪmbə] – камера шлюза, шлюзовая камера

masonry ['meɪsənri] – каменная или кирпичная кладка

mitre gates ['maɪtə geɪts] – двустворчатые шлюзные ворота

navigation lock [ˌnævɪ'geɪʃən lɒk] – судоходный шлюз

opening ['əʊpənɪŋ] – водовыпускное отверстие

point upstream [pɔɪnt ʌp'stri:m] – вершиной против течения

rapids ['ræpɪdz] – речные пороги

recess [rɪ'ses] – углубление, ниша

rectangular [rek'tæŋɡjələ] – прямоугольный

section ['sekʃən] – участок, отрезок

ship lock [ʃɪp lɒk] – судоходный шлюз

sidewall ['saɪd,wɔ:l] – боковая стенка

slide gates sideways [slaɪd geɪts 'saɪdweɪz] – задвигать ворота в сторону от камеры шлюза

sluice [slu:s] – водовод; водопроводная галерея (*судоходного шлюза*)

structure ['strʌktʃə] – конструкция; строение

swing gates outward [swɪŋ geɪts 'aʊtwəd] – открывать ворота наружу

traverse [trə'veɪz] – пересекать, проходить

turbulence ['tɜ:bjuləns] – турбулентность

water disturbance ['wɔ:tə drɪ'stɜ:bəns] – возмущения на воде

watertight seal ['wɔ:tətaɪt si:l] – водонепроницаемое закрытие

Exercise 7. Read and translate the following text.

Navigation locks, also known as **canal locks** or **ship locks**, are engineering structures used in canals and waterways to overcome changes in water levels and facilitate the passage of vessels from one water level to another. They are an essential component of canal systems and are designed to control the flow of water and allow boats and ships to navigate through **sections with level difference**.

The primary purpose of navigation locks is to enable vessels to **traverse** canals and rivers with varying water levels caused by changes in terrain, such as hills or mountains, waterfalls, **rapids** or natural variations in terrain. By creating a series of **lock chambers**, the water level can be raised or lowered to match the elevation of the next section of the waterway. They play a vital role in connecting different **bodies of water**, facilitating transportation and supporting economic activities by providing efficient and safe passage for ships and boats.

Lock Structure. A navigation lock consists of a chamber enclosed by **gates** at both **ends**. The chamber is usually **rectangular** in shape and con-

structed of concrete or **masonry** to provide strength and durability. The gates are massive doors that can be opened or closed to control the flow of water.

Entering the Lock. When a vessel approaches a lock, it enters the chamber through the open gates. Once inside, the gates are closed behind the vessel to create a **watertight seal**. **Filling** or **emptying** of the chamber is effected by manually or mechanically operated **sluices**. In small canals these may be on the gates, but on larger canals they are on **culverts incorporated** in the lock **structure**, with openings into the chamber through the **sidewalls** or **floor**. While the sizes of the culverts and openings govern the speed of filling or emptying the chamber, the number and location of the **openings** determine the extent of the **water disturbance** in the chamber. The design must be directed toward obtaining a maximum speed of operation with minimum **turbulence**.

Water Level Adjustment. To raise or lower the water level, the lock gates are operated. If the vessel needs to move from a lower water level to a higher one, water is allowed to flow into the chamber from an upper section of the waterway. This raises the water level in the lock chamber, lifting the vessel to the higher level. The whole operation usually takes between 10 and 20 minutes, depending on the size of the lock and whether the water in the lock chamber was at the boat's level or the other level when it arrived at the lock.

Gate Operation: The most generally used are **mitre gates** consisting of two **leaves**, the **combined lengths** of which exceed the lock width by about 10 percent. On small canals, gates may be manually operated by a **lever arm** extending over the lock side; on large canals, hydraulic, mechanical, or electrical power is used. Typically, gates are opened by **swinging them outward** or **sliding them sideways**. When opened, the leaves are **housed** in lock wall **recesses**; when closed, after turning through about 60°, they meet on the lock **axis** in a V-shape with its **point upstream**. Mitre gates can be operated only after water levels on each side have been equalized.

Exercise 8. Translate the expressions into Russian paying attention to the prepositions.

1. The passage *of* vessels *from* one water level *to* another; 2. To navigate *through* sections *with* level difference; 3. Rivers *with* varying water levels; 4. A vital role *in* connecting different bodies *of* water; 5. A chamber enclosed *by* gates *at* both ends; 6. Rectangular *in* shape; 7. The gates are

closed **behind** the vessel; 8. To exceed the lock width **by about** 10 percent; 9. Gates are opened **by** swinging them outward; 10. To arrive **at** the lock.

Exercise 9. Translate the following words and word combinations into Russian.

Navigation locks; canal locks; level difference; series of lock chambers; rapids; bodies of water; gates of a lock; rectangular in shape; masonry; watertight seal; mechanically operated sluices; culverts; water disturbance in the chamber; minimum turbulence; mitre gates; combined lengths; lever arm; lock axis; V-shape with its point upstream; wall recesses; house.

Exercise 10. Translate the words and word combination in brackets into English using the text.

1. They are an (важный компонент) of canal systems and are designed to control the (поток воды) and allow boats and ships (совершать плавание по участкам) with level difference.

2. By creating a (ряд камер шлюзов), the water level can be raised or lowered to match the (высота следующего участка) of the waterway.

3. The chamber is usually (прямоугольная форма) and constructed of (бетон или кирпичная кладка) to provide strength and durability.

4. When opened, the (створки помещаются в нишах стен шлюза); when closed, (повернувшись примерно на 60°), they meet on the lock axis in a V-shape with its (вершиной направленной вверх по течению).

Exercise 11. Translate the following words and word combinations into English using the text.

Инженерные сооружения; преодолеть перепады уровня воды; основное назначение; различные уровни воды; горы; пороги; способствовать перевозке; проход для кораблей и лодок; массивные двери; контролировать поток воды; наполнение и опорожнение камеры; конструкция шлюза; боковая стенка или днище; расположение водовыпускных отверстий; повышать или понижать уровень воды; верхний участок водного пути; превышать ширину шлюза примерно на 10%.

Exercise 12. Answer the following questions.

1. Where are navigation locks as engineering structures used in? 2. What is the primary purpose of navigation locks? 3. What kind of shape is a lock chamber? 4. How is filling or emptying of a chamber effected? 5. What governs the speed of filling or emptying the chamber? 6. What determines the extent of the water disturbance in the chamber? 7. How much time does the operation of moving vessel from a lower water level to a higher one last? 8. What type of gates are the most generally used in lock chambers?

UNIT 16

Navigation Locks

Part II

Словообразование

Приставки **in-**, **il-**, **im-**, **ir-**, прибавляемые к прилагательным, образуют прилагательные с отрицательным значением:

visible (видимый) – **invisible** (невидимый);
logical (логический) – **illogical** (нелогичный);
moral (моральный) – **immoral** (аморальный);
resistible (отразимый) – **irresistible** (неотразимый).

Exercise 1. Form the adjectives using the negative prefixes. Translate them into Russian.

Model: delicate – indelicate

in- – comparable, frequent, accurate, artistic, attentive, capable;

il- – legible, literate, liberal, legal, logical, licit, liquid, legitimate;

im- – possible partial, patient, movable, modest, material, measurable;

ir- – responsible, resolute, regular, rational, relevant, receptive.

Приставка **un-**, прибавляемая к глаголам, прилагательным и иногда к существительным, образует слова с отрицательным значением:

to fasten (прикреплять) – to **unfasten** (откреплять);

suitable (подходящий) – **unsuitable** (неподходящий);

truth (правда) – **untruth** (неправда).

Exercise 2. Form the new words using the prefix un-. Translate them into Russian.

Model: to coil – to uncoil

To saddle, changed, explored, kind, true, safe, reasonable, bearable.

The Passive Voice (Пассивный залог)

Пассивный залог (The Passive Voice) употребляется, когда в центре внимания говорящего находится лицо или предмет, которые *подвергаются действию*, а не лицо или предмет, которые *совершают действие*.

В пассивном обороте лицо или предмет, которые подвергаются действию, являются подлежащими и стоят на первом месте.

	Present	Past	Future
Indefinite	The film is shown every day. Is the film shown every day? The film is not shown every day.	The film was shown yesterday. Was the film shown yesterday? The film was not shown yesterday.	The film will be shown tomorrow. Will the film be shown tomorrow? The film will not be shown tomorrow.
Continuous	The film is being shown now. Is the film being shown now? The film is not being shown now.	The film was being shown at 5 yesterday. Was the film being shown at 5 yesterday? The film was not being shown at 5 yesterday.	
Perfect	The film has just been shown . Has the film been shown ? The film has not been shown yet.	The film had been shown by 5 o'clock. Had the film been shown by 5 o'clock? The film had not been shown by 5 o'clock.	The film will have been shown by 5 o'clock. Will the film have been shown by 5 o'clock? The film will not have been shown by 5 o'clock.

I. Форма пассивного залога образуется с помощью глагола **to be** в нужной форме (в зависимости от времени) и причастия прошедшего времени (**Participle II**) смыслового глагола. Построение предложения в пассивном залоге в разных временах происходит следующим образом:

1. **Present Indefinite Passive** (настоящее неопределенное время) в пассивном залоге образуется по формуле: **am/is/are + Participle II**:

These books *are used* for work. – Эти книги *используются* для работы.

The office *is cleaned* every day. – Офис *убирается* каждый день.

2. **Past Indefinite Passive** (прошедшее неопределенное время) в пассивном залоге образуется по формуле: **was/were + Participle II**:

This picture *was painted* in the 16th century. – Эта картина *была написана* в 16 веке.

These houses *were built* in 1954. – Эти дома *были построены* в 1954 г.

3. **Future Indefinite Passive** (будущее неопределенное время) в пассивном залоге образуется по формуле: **shall/will be + Participle II**:

The car *will be repaired* tomorrow. – Автомобиль *будет отремонтирован* завтра.

The article *will be written* next week. – Статья *будет написана* на следующей неделе;

4. **Present Continuous Passive** (настоящее длительное время) в пассивном залоге образуется по формуле: **am/is/are being+Participle II**:

I feel that I *am being watched* now by somebody. – Я думаю, что *на меня кто-то смотрит*.

The road *is being repaired* at present. – Дорога *ремонтируется* в данный момент.

5. **Past Continuous Passive** (прошедшее длительное время) в пассивном залоге образуется по формуле: **was/were being + Participle II**:

At six o'clock a story *was being told*. – В шесть часов историю *рассказывали*.

They *were being watched* carefully. – За ними внимательно *наблюдали*;

6. **Present Perfect Passive** (настоящее совершенное время) в пассивном залоге образуется по формуле: **have/has been + Participle II**:

This coffee *has just been made*, help yourself. – Кофе только что *был приготовлен*, угощайтесь.

The presents *have already been bought*. – Подарки уже *куплены*.

7. **Past Perfect Passive** (прошедшее совершенное время) в пассивном залоге образуется по формуле: **had been + Participle II**:

All the windows *had been cleaned* before the storm. – Все окна *были вымыты* перед грозой.

The letter *had been written* by 5 o'clock yesterday. – Письмо *было написано* к 5 часам вчера;

8. **Future Perfect Passive** (будущее совершенное время) в пассивном залоге образуется по формуле: **shall/will have been + Participle II**:

By this time tomorrow the deal *will have been signed*. – Завтра к этому времени договор *будет подписан*.

The article *will have been translated* by this time tomorrow. – Статья *будет переведена* к этому времени завтра.

II. На русский язык глаголы в **Passive Voice** могут переводиться следующими способами:

1. сочетанием глагола **быть** (в прошедшем и будущем временах) с краткой формой причастия страдательного залога:

The article *was transplanted*. – Статья *была* переведена.

The article *will be translated*. – Статья *будет* переведена;

2. глаголом с окончанием на **-ся, -сь**:

Technical articles *are translated* at every lesson. – Технические статьи *переводятся* на каждом уроке;

3. неопределенно-личной формой, т. е. без подлежащего:

Technical articles *are translated* at every lesson. – Технические статьи *переводят* на каждом уроке.

Глагол в форме ***Indefinite Passive*** может переводиться на русский язык глаголом совершенного и несовершенного вида, так как форма ***Indefinite*** не уточняет характера действия:

Houses *are built* very quickly now. – Дома строятся (строят) теперь очень быстро.

III. В английском языке в страдательном залоге показателем времени служит глагол **to be**, который изменяется в зависимости от лица и числа подлежащего. Смысловой глагол стоит всегда в форме **Participle II**, т. е. остается неизменным.

1. New films *are shown* here every week. – Новые фильмы показывают здесь каждую неделю.

2. A new film *was shown* here yesterday. – Новый фильм был показан здесь вчера.

3. A new film *will be shown* here tomorrow. – Новый фильм будет показан здесь завтра.

IV. Если указывается, кем или чем производится действие, то употребляется существительное или местоимение с предлогом **by**, если речь идет о дополнении в **творительном падеже** (отвечающем на вопрос кем? чем?) или с предлогом **with** для указания на материал или орудие, при помощи которого совершается действие:

The new engine *was designed by* our engineers. – Новый двигатель был сконструирован нашими инженерами.

The laboratory is equipped *with* automatic machinery. – Лаборатория оборудована автоматическими механизмами.

V. В английском предложении за сказуемым в страдательном залоге может следовать предлог; слово, с которым этот предлог соотносится, является подлежащим. Поэтому при переводе на русский язык этот предлог ставится *перед* подлежащим:

The engineer was sent *for*. – За инженером послали.

This article is much spoken *about*. – Об этой статье много говорят,

VI. Подлежащее английского предложения пассивной конструкции при переводе на русский язык может стоять не только в именительном падеже, но и в любом косвенном падеже в зависимости от контекста.

The *chief engineer* was sent abroad. – Главного инженера послали за границу.

The *chief engineer* was sent many telegrams. – Главному инженеру послали много телеграмм.

This information was referred *to*. – На эту информацию ссылались.

Exercise 3. Translate the sentences in the Present Indefinite Passive into Russian.

1. A lot of e-mails are sent and received every day. 2. The meal is prepared by Tom. 3. When are grocery shops closed in England? 4. What ingredients are used to make a pizza? 5. England is visited by millions of tourists every year. 6. I am presented to Dr. Green. 7. What berries are grown in your garden? 8. New computer programmes are used in this project. 9. I am shown a new film, aren't I? 10. I am not taken to the concert, am I? 11. He is often scolded by his mother, isn't he?

Exercise 4. Translate the sentences in the Past Indefinite Passive into Russian.

1. He was told that story. 2. I was shown the way by the boy. 3. Many houses were burnt by The Great Fire of London. 4. The boat was carried away by the waves. 5. Something very interesting was told us by the teachers. 6. My cat was not given milk yesterday, was it? 7. The match was played in the evening. 8. He was advised to be more patient. 9. My friend and I were sent to clean the yard, weren't we? 10. The answers were calculated very quickly. 11. Was his last movie filmed in black and white?

Exercise 5. Translate the sentences in the Future Indefinite Passive into Russian.

1. The streets will be widened. 2. The buses will be repaired, won't they? 3. Will the trees and flowers be planted? 4. Where will a fountain be put up? 5. The bus stop will be rebuilt. 6. The old houses will be pulled down. 7. When will the shops be opened? 8. The lampposts on the roads will be modernized. 9. The benches will not be painted, will they? 10. The book will be returned. 11. The room will not be cleaned. 12. Will the text be typed? 13. The old clothes will be mended. 14. Will the fruits be washed? 15. The device will not be connected network.

Exercise 6. Translate the sentences in the Present Continuous Passive into Russian.

1. The bridge is being built now. 2. The papers are not being read right now. 3. Is TV being watched at the moment? 4. The car is being repaired, isn't it? 5. I am not being taught, am I? 6. How is the dinner being cooked? 7. Where is the picture being painted? 8. The book is not being sold. 9. Is coffee being drunk right now? 10. Clothes are being packed now. 11. Salads are not being eaten. 12. Am I being looked for?

Exercise 7. Translate the sentences in the Past Continuous Passive into Russian.

1. The plant was being built by construction workers. 2. The pictures were not being painted by Pat, were they? 3. Was I being listened to by my

friend? 4. The report was being printed, wasn't it? 5. The car was not being driven by a pupil. 6. Were the exercises being completed by them when he came? 7. Whom was the bed being made by? 8. The products were not being bought by her when he called 9. Was the tea being drunk? 10. The music was being composed. 11. The books were not being written.

Exercise 8. Translate the sentences in the Present Perfect Passive into Russian.

1. The video has been recorded by him. 2. Why has this letter been opened? 3. The fruit has not been cut, has it? 4. All changes have been saved. 5. Why hasn't the debt been paid? 6. Have the pencils been sharpened? 7. Whom have the notebooks been handed out by. 8. Has the tea been drunk? 9. The recordings have not been listened to. 10. The film has been watched by students. 11. The sentence has not been erased

Exercise 9. Translate the sentences in the Past Perfect Passive into Russian.

1. The song had been sung by 10 in the evening. 2. Had you been given instructions? 3. The flowers had been watered, hadn't they? 4. John hadn't been asked that question before Sue came. 5. The trash hadn't been thrown out. 6. Whom had the dishes been washed by? 7. The dog had been walked by him. 8. The cat had been taught to jump. 9. A lot of things had been done before the children returned. 10. I had not been answered all the questions. 11. Nick hadn't been offered anything by Pete.

Exercise 10. Translate the sentences in the Future Perfect Passive into Russian.

1. The boxes will have been brought by evening. 2. The poem will not have been learned by Monday. 3. Will the homework have been done by 7 p.m.? 4. The tea will have been drunk by afternoon. 5. The coffee will not have been made. 6. Will the game have been watched? 7. The books will have been received, won't they? 8. The exercise-books will not have been handed out. 9. Will the program have been installed? 10. The letter will have been written. 11. The horse will not have been ridden.

Exercise 11. Read and memorize the following words and word combinations.

accommodate [ə'kɒmədeɪt] – вмещать

adjacent [ə'dʒeɪsənt] – расположенный рядом, смежный

adjust [ə'dʒʌst] – выравнивать

barge [ba:dʒ] – баржа, барка, баркас

commercial craft [kə'mɜ:ʃəl kra:f] – торговое судно

crack [kræk] – трещина, щель

decline [dɪ'klaɪn] – спуск, склон

double lock ['dʌbl lɒk] – двойной шлюз, двухкамерный шлюз
flight of locks [flaɪt əv lɒk] – многокамерный шлюз, каскад шлюзов
handle ['hændl] – обслуживать

incline [ɪn'klaɪn] – подъем, уклон

labour-intensive [,leɪbə(r)-ɪn'tensɪv] – трудоёмкий

level difference ['levəl 'dɪfərəns] – перепад высот, разность уровней

lock keeper [lɒk 'ki:pə] – шлюзовщик, смотритель шлюза

lock operator [lɒk 'ɒpəreɪtə] – шлюзовщик, оператор шлюза

maintenance ['meɪntənəns] – техническое обслуживание

occasional repair [ə'keɪzənəl rɪ'peə] – периодический ремонт

ocean-going vessel ['əʊʃən-ɡəʊɪŋ 'vesəl] – океанское судно

Panama Canal [prə'nɑː kə'næl] – Панамский канал (*судоходный канал, соединяющий Панамский залив Тихого океана с Карибским морем и Атлантическим океаном, расположен на Панамском перешейке на территории государства Панама*)

profound impact [prə'faʊnd 'ɪmpækt] – сильное влияние

proper ['prɒpə] – должный, надлежащий

recreational boat [,rekri'eɪʃənəl bəʊt] – прогулочное судно

routine maintenance [ru:'tiːn 'meɪntənəns] – плановое (техническое)

обслуживание

sea lock [siː lɒk] – морской шлюз

sealing ['siːlɪŋ] – герметизация, закрытие

section ['sekʃən] – участок, отрезок

shortcut ['ʃɔːtkʌt] – кратчайшее расстояние, кратчайший путь

single lock ['sɪŋgl lɒk] – одиночный шлюз

strain [streɪn] – нагрузка

Suez Canal [suː'ez kə'næl] – Суэцкий канал (*бесшлюзовой судоходный канал в Египте, соединяющий Средиземное море с Красным*)

tidal variations ['taɪdəl'veəri'eɪʃən] – приливные изменения, приливные колебания

Exercise 12. Read and translate the following text.

Exiting the Lock. Once the water level in the lock chamber has been adjusted to match the next **section** of the waterway, the exit gates are opened. The vessel moves out of the lock and continues its journey at the new water level. There are different types of locks used in navigation systems, including:

Single Lock. A **single lock** is the simplest type of lock, consisting of one chamber that raises or lowers vessels to the desired water level.

Double Lock. A **double lock** system consists of two **adjacent** chambers. Vessels enter one chamber and once the water level is **adjusted**, they move into the adjacent chamber to reach the desired water level.

Flight of Locks. In areas where a significant change in elevation needs to be overcome, a series of locks, known as a flight of locks, may be constructed. This allows vessels to traverse a steep **incline** or **decline** gradually, reducing the **strain** on the lock system.

Sea Lock. Sea locks are used in coastal areas where canals or waterways meet the ocean. These locks are designed to protect the inland waterways from the **tidal variations** and ensure a controlled passage for vessels.

Lock Operation: Navigation locks can be operated manually or automated, depending on their size and location. Smaller locks may require manual operation using **lock keepers** or **lock operators** who manually open and close the gates and control the water flow. Larger locks often employ hydraulic or electric systems for gate operation, making the process more efficient and less **labor-intensive**.

Lock Dimensions: Navigation locks come in various sizes to **accommodate** different types of vessels. Their dimensions are determined by factors such as the expected traffic volume, the size of vessels using the waterway, and the water **level differences** between sections. Larger locks can **handle ocean-going vessels** and **barges**, while smaller locks are suitable for **recreational boats** and smaller **commercial craft**.

Maintenance and Repair: Like any infrastructure, navigation locks require regular **maintenance** and **occasional repair**. This includes inspecting and maintaining the gates, ensuring **proper sealing**, inspecting the lock chamber for **cracks** or damage, and maintaining the hydraulic or electrical systems. **Routine maintenance** is crucial to keep the locks operational, prevent water leakage, and ensure the safety of vessels passing through.

Historical Significance: Navigation locks have played a vital role in the development of transportation and trade throughout history. They have enabled the creation of extensive canal systems, such as the **Panama Canal** and the **Suez Canal**, which have had a **profound impact** on global trade by providing efficient **shortcuts** and connections between major water bodies. Locks have also been used for irrigation purposes, flood control, and hydro-electric power generation.

Exercise 13. Translate the following words and word combinations into Russian using the text.

Section of the waterway; different types of locks; navigation systems; single lock; double lock system; adjacent chambers; change in elevation; flight of locks; steep incline or decline; tidal variations; lock operators; employ hydraulic or electric systems; accommodate; handle ocean-going vessels; level differences between sections; barges; recreational boats; cracks; commercial craft; regular maintenance; occasional repair; shortcuts.

Exercise 14. Match adjectives with nouns using the text. Translate the collocations.

- | | |
|----------------|----------------|
| 1. different | a) operation |
| 2. significant | b) waterways |
| 3. coastal | c) systems |
| 4. inland | d) shortcuts |
| 5. manual | e) change |
| 6. electric | f) areas |
| 7. regular | g) trade |
| 8. global | h) types |
| 9. efficient | i) maintenance |

Exercise 15. Complete the following sentences. Find the right words in the text.

1. A single lock is ____ of lock.
2. A double lock system consists of two ____ .
3. Vessels move into the adjacent chamber to reach the ____ .
4. Larger locks often employ hydraulic or electric systems ____ .
5. Larger locks can handle ocean-going ____ .
6. Smaller locks are suitable for ____-____ and ____ .
7. Routine maintenance is crucial to keep the ____ .
8. Navigation locks have played a ____ in the development of ____ and ____ throughout history.
9. Locks have also been used for ____ , flood control, and ____ .

Exercise 16. Translate the following words and word combinations into English using the text.

Следующий участок водного пути; судно выходит из шлюза; поднимает или опускает суда; необходимый уровень воды; значительный перепад высоты; нагрузка; встречаться с океаном; управляться вручную или автоматически; ожидаемая интенсивность движения; судоводные шлюзы; регулярное техническое обслуживание; обеспечение надлежащей герметизации; трещины или повреждение; гидравлические или электрические системы; безопасность судов; водоемы.

Exercise 17. Answer the following questions?

1. What types of locks are there in navigation systems?
2. What is a single lock like?
3. How does a double lock system function?
4. What may be constructed to overcome a significant change in elevation?
5. What are sea locks designed for?
6. How can smaller and larger navigation locks be operated?
7. What factors are the dimensions of navigation locks determined by?
8. What role of navigation locks can we note throughout history?

UNIT 17

Flood

Словообразование

Суффиксы **-able(-ible)**, прибавляемые к глаголам, а иногда к существительным, образуют прилагательные со значением возможности совершения действия, обозначенного глаголом:

to eat (есть) – **eatable** (съедобный);

notice (извещение) – **noticeable** – (достойный внимания)

to resist (противостоять) – **resistible** (отразимый).

Exercise 1. Form the new words using the suffix -able(-ible). Translate them into Russian.

Model: prevent – preventable; exhaust – exhaustible

-able – change, know, agree, service, check, buy, pay, expend.

-ible – reduce, convince, convert, respond, extend, divide.

Суффикс **-ize** прибавляемый к прилагательным и к существительным образуют глаголы:

material (материальный) – to **materialize** (осуществлять)

summary (краткая сводка) – to **summarize** (суммировать)

Exercise 2. Form the new words using the suffix -ize. Translate them into Russian.

Model: mineral – to mineralize

Hospital, special, local, general, standard, natural, real, legal, colony.

The Sequence of Tenses (Согласование времен)

В русском языке глагол-сказуемое придаточного дополнительного предложения может употребляться в любом времени (*настоящем, прошедшем или будущем*) в зависимости от содержания. В английском языке это возможно тогда, когда глагол-сказуемое главного предложения стоит в *настоящем или будущем времени*, следовательно, глагол-сказуемое придаточного предложения может стоять в любом, требуемом по смыслу времени, например:

I think that it will rain. – Я думаю, что *пойдет* дождь.

He understands that he has made a mistake. – Он *понимает*, что *совершил* ошибку.

Tom says that he *was* busy yesterday. – Том *говорит*, что *был* занят вчера.

Если глагол-сказуемое главного предложения стоит в *прошедшем времени*, то *действует* правило согласования времен, которое состоит в том, что сказуемое придаточного дополнительного предложения согласуется со сказуемым главного. Данные правила также соблюдаются при переводе прямой речи в косвенную:

He says, "I *am* busy today". – He *said* that he *was* busy that day.

The Sequence of Tenses in the Sentence (Согласование времен в предложении)

Прямая речь		Косвенная речь
Present Indefinite	→	Past Indefinite
Past Indefinite	→	Past Perfect
Future Indefinite	→	Future Indefinite-in-the-Past
Present Continuous	→	Past Continuous
Past Continuous	→	Past Perfect Continuous
Future Continuous	→	Future Continuous-in-the-Past
Present Perfect	→	Past Perfect
Past Perfect	→	Past Perfect
Future Perfect	→	Future Perfect-in-the-Past

1. **Present Indefinite** в придаточном предложении при согласовании времен переходит в **Past Indefinite**:

Nick says that he *likes* going to the cinema. – Ник *говорит*, что ему *нравится* ходить в кино.

Nick *said* that he *liked* going to the cinema. Ник *сказал*, что ему *нравится* ходить в кино.

2. **Past Indefinite** в придаточном предложении при согласовании времен переходит в **Past Perfect**:

Dick says that he *saw* that film. – Дик *говорит*, что он *видел* этот фильм.

Dick *said* that he *had seen* this film. – Дик *сказал*, что он *видел* этот фильм.

3. **Future Indefinite** в придаточном предложении при согласовании времен переходит в **Future Indefinite-in-the-Past**. При этом вспомогательные глаголы будущего времени **shall/will** переходят в **should/would**. На русский язык эта форма переводится глаголом в будущем времени:

Sue says that she *will finish* that work. – Сью *говорит*, что она *закончит* эту работу.

Sue *said* that she *would finish* that work. – Сью *сказала*, что она *закончит* эту работу.

4. **Present Continuous** в придаточном предложении при согласовании времен переходит в **Past Continuous**:

Mary says that she *is reading* a book. – Мэри *говорит*, что она *читает* книгу.

Mary *said* that she *was reading* a book. – Мэри *сказала*, что она *читает* книгу.

5. **Future Continuous** в придаточном предложении при согласовании времен переходит в **Future Continuous-in-the-Past**:

John says that he *will be watching* TV. – Джон *говорит*, что он *будет смотреть* телевизор.

John *said* that he *would be watching* TV. – Джон *сказал*, что он *будет смотреть* телевизор.

6. **Present Perfect** в придаточном предложении при согласовании времен переходит в **Past Perfect**:

Victor says that he *has done* his home task. – Виктор *говорит*, что он *выполнил* свое домашнее задание.

Victor *said* that he *had done* his home task. – Виктор *сказал*, что он *выполнил* свое домашнее задание.

7. **Past Perfect** в придаточном предложении при согласовании времен остается **Past Perfect**:

Nick says that he *had arrived* in time. – Ник *говорит*, что он *приехал* вовремя.

Nick *said* that he *had arrived* in time. – Ник *сказал*, что он *приехал* вовремя.

8. **Future Perfect** в придаточном предложении при согласовании времен переходит в **Future Perfect-in-the-Past**:

Sandra says that she *will have come* by 6 tomorrow. – Сандра *говорит*, что она *приедет* к 6 часам завтра.

Sandra *said* that she *would have come* by 6 the next day. – Сандра *сказала*, что она *приедет* к 6 часам следующего дня.

9. Предложения, выражающие общий вопрос в прямой речи, в косвенную речь вводятся с помощью союза **whether** или **if**:

He *asked me*: “Are you *translating* the article?” – Он спросил меня: «Ты *переводишь* статью?»

He *asked me if (whether)* I *was translating* the article. – Он спросил меня, *перевожу* ли я статью.

Глаголы **should, ought** и **must** употребляются в придаточном предложении независимо от того, в каком времени стоит глагол-сказуемое главного предложения:

He *says (said)* that I *ought to* send her a telegram. – Он говорит (сказал), что мне следует послать ей телеграмму.

I *tell (told)* him that he *should* consult a doctor. – Я говорю (сказал) ему, что ему следует обратиться к врачу.

He *tells (told)* us that we *must* not cross the street. – Он говорит (сказал), что нам нельзя переходить через дорогу.

Exercise 3. Translate the following sentences into Russian

1. He knew he had a problem. 2. He realized he would be alone. 3. We hoped she would be waiting for us at six o'clock. 4. He said that Peter had booked tickets for the theatre the previous week. 5. Mr. Stone told me that the meeting would take place the following month. 6. He proved he was the best. 7. She imagined she could do that. 8. He told them he would speak to Mr. Smith about it if he saw him the next day. 9. Jane said she should learn that poem. 10. James told his friends he liked to watch TV shows. 11. She said she couldn't for a walk with me. 12. Miss Brooks said that Dr. Dodd was speaking on the phone then. 13. She said her husband was a manager in a big factory. 14. He said that Byron was born on January 22, 1788. 15. He said that he met Ann when he was going to the supermarket.

Exercise 4. Put the following sentences into the indirect speech according to the rules of the Sequence of Tenses.

Model: He *said*, "I *work* in New York." –

He *said* that he *worked* in New York.

1. Sue said, "I speak French." 2. She said, "I am speaking French well." 3. She said, "I have spoken French." 4. She said, "I spoke French." 5. She said, "I am going to speak French." 6. She said, "I will speak French fluently." 7. She said, "I can speak French." 8. She said, "I may speak French here." 9. She said, "I have to speak French." 10. She said, "I must speak French." 11. She said, "I should speak French." 12. She said, "I ought to speak French."

Exercise 5. Make the right choice.

1. I knew that my sister (have/has/had) a problem. 2. I know that my sister (have/has/had) a problem. 3. I knew that my sister (will have/would have/had) a problem soon. 4. He said he (lived/has lived/had lived) in Moscow since 2005. 5. She asks me if the flight (has been cancelled/had been

cancelled/been cancelled). 6. She asked me if the flight (has been cancelled/had been cancelled/was cancelled). 7. Nobody knew what (will happen/would happen/happens) next. 8. Mike said that he (hasn't met/didn't meet/hadn't met) Helen since they parted. 9. Kelly said that she (didn't want/doesn't want/hadn't wanted) to wear her hat to school. 10. We didn't expect that he (showed/will show/would show) us the film.

Exercise 6. Read and memorize the following words and word combinations.

- abruptly [ə'brʌptli] – внезапно, неожиданно
benefits ['benɪfɪts] – суммарные выгоды, общий полезный результат
blunt [blʌnt] – сглаживать, затуплять
bridge abutment [brɪdʒ ə'bʌtmənt] – опора моста; пята моста; устой (моста, плотины)
canal's full capacity [kə'nælz ful kə'pæsəti] – полная пропускная способность канала
catchment area ['kæʃmənt eəriə] – бассейн (реки, озера), водосборная площадь
channel ['ʃænəl] – направлять в (определенное) русло
concomitant [kən'kɒmɪtənt] – сопутствующий, сопровождающий
defenses [dɪ'fensɪs] – средства защиты
down a coast [daʊn ə kəʊst] – вдоль берега
elevated roadway ['elɪveɪtɪd 'rəʊdweɪ] – надземная дорога
elsewhere [ˌels'weə] – в другом месте
embankment [ɪm'bæŋkmənt] – оградительная дамба
exacerbate [ɪg'zæsəbeɪt] – усугублять, усиливать
failure of dam ['feɪljə əv dæm] – прорыв плотины, прорыв дамбы
flood [flʌd] – наводнение, паводок; разлив
floodplain [ˈflʌdpleɪn] – пойма
floodway ['flʌdweɪ] – канал для сброса паводка
impact ['ɪmpækt] – последствие, результат
impair [ɪm'peə] – нарушать(ся), повреждать(ся)
impervious [ɪm'pɜːviəs] – водонепроницаемый
interfere with [ˌɪntə'fɪə] – служить препятствием, мешать, быть помехой (чему-л.)
levee ['levi] – ограджающая (берегозащитная) дамба
low-lying area [ləʊ-'laɪɪŋ 'eəriə] – низменность, низменный район
meander [mɪ'ændə] – изгиб, излучина (реки)
mitigation [ˌmɪtɪ'geɪʃən] – уменьшение
prone [prəʊn] – склонный или предрасположенный (к чему-л.)

retention pond [rɪ'tenʃən pɒnd] – отстойный пруд
 sediment deposition ['sedɪmənt ,depə'zɪʃən] – отложение осадка
 sewer line ['səʊə laɪn] – канализационный трубопровод
 short spike [ʃɔ:t spaɪk] – резкий скачок, пик
 slight [slaɪt] – небольшой, незначительный
 snowmelt ['snəʊmelt] – снеготаяние, таяние снегов
 spawning ground ['spɔ:nɪŋ graʊnd] – нерестилище, место нереста
 sponge [spʌndʒ] – губка
 spurt of water [spɜ:t əv 'wɔ:tə] – поток воды
 steep [sti:p] – чрезмерный, непомерно высокий
 structural damage ['strʌktʃərəl 'dæmɪdʒ] – повреждение (разрушение) конструкции
 surface (water) runoff ['sɜ:fɪs ('wɔ:tə) 'rʌnɒf] – поверхностный сток
 tide [taɪd] – прилив и отлив (*на море, океане*)
 tsunami [tsu'nɑ:mi] – цунами
 wildfire ['waɪldfaɪə] – пожар разрушительной силы (*начинается в лесу или сельской местности и распространяется на огромных площадях*)

Exercise 7. Read and translate the following text.

Floods are caused by many factors or a combination of any of these generally prolonged heavy rainfall (locally concentrated or throughout a **catchment area**), highly accelerated **snowmelt**, severe winds over water, unusual high **tides**, **tsunamis**, or **failure of dams, levees, retention ponds**, or other structures that retain the water. Flooding can be **exacerbated** by increased amounts of **impervious** surface or by other natural hazards such as **wildfires**, which reduce the supply of vegetation that can absorb rainfall. During times of rain, some of the water is retained in ponds or soil, some is absorbed by grass and vegetation, some evaporates, and the rest travels over the land as **surface runoff**. Floods occur when ponds, lakes, riverbeds, soil, and vegetation cannot absorb all the water.

Flooding has many impacts. It damages property and endangers the lives of humans and other species. Rapid **water runoff** causes soil erosion and **concomitant sediment deposition** elsewhere (such as further downstream or **down a coast**). The **spawning grounds** for fish and other wildlife habitats can become polluted or completely destroyed. Some prolonged high floods can delay traffic in areas which lack **elevated roadways**. Floods can **interfere with** drainage and economical use of lands, such as interfering with farming. **Structural damage** can occur in **bridge abutments**, bank lines, **sewer lines**, and other structures within **floodways**. Waterway naviga-

tion and hydroelectric power are often **impaired**. Financial losses due to floods are typically millions of dollars each year, with the worst floods in recent U.S. history having cost billions of dollars.

Water levels during a flood tend to rise then fall very **abruptly**. The peak flood level occurs as a very **steep short spike**; a quick **spurt of water**. Anything that slows the surface runoff (marshes, **meanders**, vegetation, porous materials, turbulent flow, river spreading over a **floodplain**) will slow some of the flow more than other parts, spreading the flow over time and **blunting** the spike. Even slight blunting the spike significantly decreases the peak flood level. Generally, the higher the peak flood level, the more flood damage is done. Modern flood control seeks to “slow the flow”, and deliberately flood some **low-lying areas**, ideally vegetated, to act as **sponges**, letting them drain again as the floodwaters go down.

When more homes, shops and infrastructure are threatened by the effects of flooding, then the **benefits** of protection are worth the additional cost. Temporary flood defenses can be constructed in certain locations which are **prone** to floods and provide protection from rising flood waters. Rivers running through large urban developments are often controlled and **channeled**. Water rising above a **canal's full capacity** may cause flooding to spread to other waterways and areas of the community, which causes damage. **Defenses** (both long-term and short-term) can be constructed to minimize damage, which involves raising the edge of the water with levees, **embankments** or walls. The population and high value of infrastructure at risk often justifies the high cost of **mitigation** of damage in large urban areas.

Exercise 8. Translate the expressions into Russian paying attention to the prepositions.

1. During times **of** rain; 2. Severe winds **over** water; 3. Floods are caused **by** many factors; 4. The spawning grounds **for** fish; 5. Floods can interfere **with** drainage; 6. Financial losses **due to** floods; 7. The benefits **of** protection; 8. Rivers running **through** urban developments; 9. Cost **of** mitigation **of** damage **in** large urban areas. 10. To slow some **of** the flow.

Exercise 9. Translate the following words and word combinations into Russian.

Floods; catchment area; snowmelt; high tides; tsunamis; failure of dams; levees; retention ponds; impervious surface; surface runoff; concomitant sediment deposition; spawning grounds for fish; structural damage; bridge abutments; structures within floodways; abruptly; floodplain; quick spurt of water; marshes; meanders; low-lying areas; prone to floods; canal's full capacity; embankments; high value of infrastructure; benefits.

Exercise 10. Translate the words and word combination in brackets into English using the text.

1. (Наводнения) occur when (пруды, озера, русла рек, почва), and vegetation cannot (впитать всю воду). 2. Floods can (препятствовать дренажу) and economical use of lands, such as (нарушение сельскохозяйственных работ). 3. Rivers running through (крупные городские районы) are often controlled and (направляются в определенное русло). 4. Even (небольшое сглаживание) the spike significantly decreases the (пиковый уровень наводнения). 5. (Судоходство по водным путям) and hydroelectric power (часто нарушаются).

Exercise 11. Translate the following words and word combinations into English using the text.

Продолжительные проливные дожди; резкое таяние снега; природные бедствия; впитываться травой и растительностью; много последствий; наносить ущерб; подвергать опасности жизни людей; вызывать почвенную эрозию; задерживать движение транспорта; надземная дорога; финансовые потери; пористые материалы; турбулентный поток; временные средства защиты от наводнения; места, которые предрасположены к наводнению; свести к минимуму ущерб; уровень воды.

Exercise 12. Answer the following questions.

1. What factors are floods caused by? 2. How can flooding be exacerbated? 3. What happens to water during times of rain? 4. What impacts does flooding have? 5. Where can structural damage occur? 6. What are typical financial losses due to floods? 7. What happens to water levels during a flood? 8. Where can temporary flood defenses be constructed? 9. What is the purpose of long-term and short-term defenses?

UNIT 18

Flood Control

Словообразование

Суффикс **-ate**, прибавляемый к существительным и к прилагательным образует глаголы:

active (активный) – to **activate** (активизировать);

oxygen (кислород) – to **oxygenate** (насыщать кислородом)

Exercise 1. Form the new words using the suffix – (i)ate. Translate them into Russian.

Model: origin – to originate

Hydrogen, differentia, valid, luxury, domestic, rustic, motive, alien.

Суффикс **-en**, прибавляемый к прилагательным и к существительным, образует глаголы:

black (чёрный) – to blacken (чернеть);

height (высота) – to heighten (повышать).

Exercise 2. Form the new words using the suffix -en. Translate them into Russian.

Model: threat – to threaten

Heart, red, tight, fresh, light, soft, fright, glad, sad, mad, strength, length.

The Conditional Sentences

(Условные предложения)

Условные предложения могут выражать реальные, маловероятные и нереальные условия. В зависимости от характера условия предложения принято подразделять на условные предложения *первого типа* (реальное условие), *второго типа* (нереальные или маловероятные условия, относящиеся к настоящему или будущему времени) и *третьего типа* (нереальные условия, относящиеся к прошедшему времени).

1. Условие, содержащееся в условном придаточном предложении *первого типа*, рассматривается говорящим как реально предполагаемый факт, относящийся к *настоящему*, *прошедшему* или *будущему* времени. В этом случае сказуемые главного и придаточного предложений выражаются глаголами в формах изъявительного наклонения:

тип I	a) If + Present Indefinite, ... Future Indefinite. b) If + Past Indefinite, ... Past Indefinite. c) If + Present Indefinite, ... Present Indefinite.
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a) If the weather *is* good, we *shall go* skiing. – Если погода *будет* хорошей, мы *пойдем* кататься на лыжах;

b) If the weather *was* good, we *went* skiing. – Если погода *была* хорошей, мы *ходили* кататься на лыжах;

c) If the weather *is* good, we *go* skiing. – Если погода *хорошая*, мы *ходим* кататься на лыжах.

2. Условие, содержащееся в условном придаточном предложении *второго типа*, рассматривается говорящим как маловероятное и относится к *настоящему* или *будущему* времени. Глагол **to be** в придаточ-

ной части употребляется в форме **were** во всех лицах Данное предложение имеет следующую структуру:

тип II	If + Past Indefinite, ... should/would + Infinitive Indefinite.
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If the plane *landed*, they *would let us know* about it. – Если *бы* самолет приземлился, они *бы* нам сообщили об этом.

I *should speak* to him if he *were* here. – Я *бы* с ним *поговорил*, если *бы* он *был* здесь.

3. Условие, содержащееся в условном придаточном предложении *третьего типа*, рассматривается говорящим как *неосуществимое*, так как относится к прошлому.

тип III	If + past perfect; ... should/would have + Participle II
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На русский язык глагол-сказуемое придаточного предложения переводится глаголом в сослагательном наклонении с частицей **бы** (в русском языке не отличается от условного придаточного предложения второго типа).

If Tom *had taken* a taxi, he *would have come* in time. – Если *бы* Том взял такси, он *приехал бы* вовремя.

Tim *would have ploughed* his field in time if he *had had* a tractor. – Тим вспахал *бы* свое поле вовремя, если *бы* у него был трактор.

The Inversion in the Conditional Sentences (Инверсия в условных предложениях)

В условных придаточных предложениях второго и третьего типа союзы **if, provided** могут быть опущены, в этом случае в придаточном предложении вспомогательный глагол (**should, had, were** и др.) ставится перед подлежащим:

Should the drought continue, a lot of people *will leave* the village. – Если засуха *продолжится*, многие люди *покинут* деревню.

Had the engine been repaired yesterday, we *should have left* the port. – Если *бы* двигатель *был отремонтирован* вчера, мы *бы* *покинули* порт.

Were there any letters from him, his sister *would telephone* me. – Если *бы* от него *были* письма, его сестра *позвонила бы* мне.

The Conjunctions of the Conditional Sentences (Условные союзы в английском языке)

if – *если*

I will stay *if* she comes. – Я останусь, если она придет.

unless – *если не*

I won't stay *unless* she comes. – Я не останусь, если она не придет.

provided (providing) – *при условии*

I will stay *provided* she comes. – Я останусь при условии, если только она придет.

Exercise 3. Translate the sentences into Russian.

a) 1. If I am not too busy, I shall go to the concert. 2. All of them will be surprised if I make such a mistake. 3. If he doesn't come in time, shall we have to wait for him? 4. If no one comes to help, we shall do the work ourselves. 5. If you put on your glasses, you will see better.

b) 1. If I had time, I would help you. 2. I should live better if I earned more money. 3. If I knew the answer, I should tell you. 4. He wouldn't come unless you invited him. 5. We shouldn't remember it if it weren't so strange.

c) 1. If I hadn't overslept, I wouldn't have been late in the office. 2. If she had been more responsible, she would have been promoted three years ago. 3. If you had read this book, you wouldn't have done errors. 4. She wouldn't have prepared this pie if she hadn't got so much commendation. 5. If I hadn't loved you, I wouldn't have married you.

Exercise 4. Put the infinitives in brackets in the correct form paying attention to the type of the conditionals.

Type I. 1. If it ... (cost) too much I will not buy it. 2. She will be angry if you ... (lose) this photo. 3. If you ... (not eat up) the bread we will feed the birds in the garden. 4. If I know the truth, I (tell) you. 5. If she wants to talk, she (ring up). 6. If it rains tomorrow, the group (go) on an excursion.

Type II. 1. If I ... (have) free time now I would watch my favourite film. 2. If I ... (be) you I wouldn't eat fast food. 3. His job ... (be) so hard if he didn't have a secretary. 4. She (feel) lonely if Peter went away. 5. We (be) pleased to see you if you arrived.

Type III. 1. If you ... (not smoke) so much you wouldn't be in hospital now. 2. If we had met him yesterday we ... (call) you. 3. If Tom had had enough time last week, he (prepare) for his exam. 4. You would have done much better in the exam if you (take) private lessons. 5. If the weather (be) nice we (go) horse-riding.

Exercise 5. Put the infinitives in brackets in the correct form.

1. If the flight is delayed, our guests (be) late. 2. We would have gone to the beach if the rain (stop). 3. They will miss the train if they (not, run). 4. If you had given her the letter, she (tear) it to pieces. 5. If Jack moves too slowly, he (not, win) the game. 6. If I lost my job today, I (move) to the country. 7. She would invite our kids if they (behave) themselves. 8. If Tom were more careful, he (not, break) things. 9. If Sue had had a car, she (drive) there. 10. You wouldn't have got wet if you (put on) your mackintosh.

Exercise 6. Read and memorize the following words and word combinations.

alternate [ɔ:l'tɜ:nət] – альтернативный, дополнительный
basement ['beismənt] – (полу) подвальный этаж, цокольный этаж
berm [bə:m] – берма, уступ
breach [bri:tʃ] – прорыв (*плотины, дамбы*)
comprehensive [ˌkɒmpri'hensɪv] – всесторонний, всеобъемлющий
conform [kən'fɔ:m] – принимать форму
compact [kəm'pæktɪd] – уплотнённый, плотно уложенный
core [kɔ:] – ядро, сердцевина
cumbersome ['kʌmbəsəm] – громоздкий, объёмный
dike [daɪk] – дамба, плотина, перемычка
earthen fill ['ɜ:θən fɪl] – насыпной грунт, намывной грунт
elevation [ˌelɪ'veɪʃən] – повышение, подъём (*уровня*)
engineered structure [ˌendʒɪ'nɪəd 'strʌktʃə] – инженерное сооружение
exert [ɪg'zɜ:t] – оказывать давление
expected [ɪk'spektɪd] – ожидаемый
floater ['fləʊtə] – буй, поплавки
flood barrier [flʌd 'bæriə] – перемычка для защиты от наводнения
flood ditch [flʌd dɪtʃ] – противопаводковая канава
floodproofing [flʌd'pru:fɪŋ] – противопаводковая защита
floodwall ['flʌdwɔ:l] – дамба обвалования, защитная стенка (*от наводнения*)
imminent ['ɪmɪnənt] – неотвратимый, неизбежный
impractical [ɪm'præktɪkəl] – бесполезный
landscape feature ['læn(d)skeɪp 'fi:tʃə] – элемент (особенность) ландшафта
landscaping ['læn(d)skeɪpɪŋ] – ландшафтные работы
lean on ['li:n ɒn] – зависеть
leverage ['li:vərɪdʒ] – использовать, задействовать

licensed engineer ['laɪsənst ,endʒɪ'nɪə] – инженер, прошедший квалификационные испытания и зарегистрированный как специалист в данной отрасли

Maeslant Storm Surge Barrier ['maeslant stɔ:m sɜ:ʒ 'bæriə] – барьер от штормовых нагонов Маслант

prohibitive [prə'hɪbətɪv] – чрезмерно, непомерно высокий (*о цене*)

push firmly down [puʃ fɜ:mli daʊn] – сильно давить

PVC [pi:vi:'si:] – поливинилхлорид, ПВХ

readily available ['redɪli ə'veɪləbl] – легкодоступный

sandbag ['sæn(d)bæg] – мешок с песком

set-up time ['setʌp taɪm] – времени на подготовку и укладку

sheet pile wall [ʃi:t paɪl wɔ:l] – шпунтовая стенка

support [sə'pɔ:t] – поддержка, укрепление

swell [swel] – набухать, увеличиваться в объеме

trigger ['trɪgə] – срабатывать, приводить в действие

unfold ['ʌn'fəʊld] – развѳртывать(ся), раскрывать(ся)

water-gate ['wɔ:tə-geɪt] – гидротехнический затвор

Exercise 7. Read and translate the following text.

Vulnerable residential complexes can be protected from floods through the use of levees and **floodwalls**. Levees and **berms** are structures made of **compacted** earthen materials with interior **cores** of impermeable soil (i.e. clay). Construction typically begins with excavation to ensure that subsurface soil conditions are taken into account in design. Floodwalls are typically **engineered structures** made of reinforced concrete. Floodwalls can be built up to 20 feet in height and can be designed to be aesthetically pleasing architectural and **landscape features**. Floodwalls are typically more expensive to construct than levees, but require less space and **landscaping** and are more resistant to erosion. Construction of all floodwalls and levees should be undertaken by **licensed engineers**.

Due to the large amount of space needed for construction, the use of levees and floodwalls may be difficult and cost **prohibitive** in urban environments and may only be suitable for integration into new construction. In particular, levees and berms require a large quantity of **earthen fill**, and a lack of **readily available, nearby** fill may cause transportation costs to be prohibitive. Higher levees and floodwalls require significantly more **support** to withstand the greater water pressure **exerted** on the **flood barrier**. Strengthening levees and floodwalls requires increases in size, which may exceed the amount of space available on a building site and become **impractical**. Levees are typically limited to 6 feet in height and floodwalls

to 4 feet to maintain cost-effectiveness. Sites with **expected** flood depths that exceed practical barrier heights should consider using **alternate** methods (e.g. **elevation** or **floodproofing**) instead of or in addition to permanent flood barriers. Barriers must be located a sufficient distance away from structures with **basements** to prevent damage to basement walls from the additional pressure from saturated soils. Regular maintenance is crucial to maintain service life.

When flooding is **imminent**, you often need a barrier to protect yourself. **Sandbags** serve this task in many scenarios, but they may require a significant amount of preparation and **set-up time**, plus they are **cumbersome** to carry around. A device known as the **water-gate** can be a useful alternative. This is a rapidly deployable device made of **PVC** material. It utilizes the pressure of oncoming water to stabilize itself. This means that the floodwaters are used to build their dam. It is very compact because the device **leverages** lightweight PVC and a design that **leans on** the water pressure to put it into action. And it works in the following way: when the flood approaches the water **unfolds** the barrier and flows inside it. The principle is simple: water enters and accumulates at the bottom of the barrier. As the water level rises, the barrier unfolds and **swells**. An integrated **float**er, positioned directly at the top of the barrier, allows it to float at the rhythm of the waves, enabling it to reduce water overtopping the barrier. Once the barrier is deployed, it **conforms** to the ground and remains stable on most surfaces.

Netherlands' flood protection system is one of the most **comprehensive** protection structures in the entire world. This complex network of flood barrier infrastructure **results from** the country's locating almost entirely below sea level. One notable barrier is known as the **Maeslant Storm Surge Barrier**. This Barrier was finished in 1997, and today, it is still one of the largest moving structures in the entire world. As the water rises in the surrounding area, sensors **trigger** the walls to close and water tanks to fill along the barrier. This water weight causes the walls to push firmly down on their foundation, keeping floodwaters from **breaching** the gates.

To create an efficient anti-flood system, it is important to design and implement modern technological solutions that have the potential of maintaining natural environment. In this respect, installing **sheet pile walls** is considered to be an environmentally friendly and constructive solution for flood control. The installation of steel sheet pile walls has become popular due to providing a safe and cost-effective solution. The sheet piles provide the best solution for building and reinforcing **flood ditches, dikes**, etc. Sheet pile walls offer good seepage resistance. The sheet piles work perfectly and provide an optimal solution against floods.

Exercise 8. Match the beginning of each sentence with its end.

1. This is a rapidly deployable ...
2. Floodwalls are typically engineered ...
3. Construction of all floodwalls and levees ...
4. One notable barrier is known ...
5. A device known as the water-gate ...
6. Regular maintenance is crucial ...
7. Once the barrier is deployed, it conforms ...
 - a) to maintain service life.
 - b) as the Maeslant Storm Surge Barrier.
 - c) should be undertaken by licensed engineers.
 - d) device made of PVC material.
 - e) structures made of reinforced concrete.
 - f) to the ground and remains stable on most surfaces.
 - g) can be a useful alternative.

Exercise 9. Translate the following words and word combinations into Russian.

Floodwalls; levees and berms; engineered structures; landscape features; licensed engineers; cost prohibitive; earthen fill; readily available; flood barrier; impractical; expected flood depths; elevation; floodproofing; basements; imminent; sandbags; preparation and set-up time; cumbersome; water-gate; device leverages lightweight PVC; alternate methods; leans on the water pressure; water unfolds the barrier; barrier unfolds and swells; integrated floater; comprehensive protection; trigger; sheet pile walls.

Exercise 10. Find in B the English equivalents to the Russian words in A.

- | A | B |
|----------------------|--|
| 1. наводнение | a) structure; b) flood; c) excavation. |
| 2. бетон | a) account; b) subsurface; c) concrete. |
| 3. дамба | a) levee; b) space; c) erosion. |
| 4. дамба обвалования | a) rhythm; b) floodwall; c) pressure. |
| 5. барьер | a) environment; b) support; c) barrier. |
| 6. буй | a) floater; b) device; c) surface. |
| 7. датчик | a) foundation; b) floodwater; c) sensor. |

Exercise 11. Translate the following words and word combinations into English using the text.

Жилые комплексы; дамбы и бермы; уплотненные материалы грунта; непроницаемый грунт; строительство; железобетон; устойчив к эрозии; подповерхностные горизонты почв; городская среда; транс-

портные расходы; давление воды; объем доступного пространства; глубина затопления; постоянные противопаводковые барьеры; быстро разворачиваемое устройство; давление набегающей воды; вода поступает и накапливается; система защиты от наводнений; установка.

Exercise 12. Answer the following questions.

1. How can residential complexes be protected from floods? 2. What are floodwalls typically made of? 3. Who can construct floodwalls and levees? 4. What do levees and berms require in particular? 5. What height should levees and floodwalls be limited to maintain cost-effectiveness? 6. Where must barriers be located to prevent damage to basement walls? 7. Are sandbags useful to protect infrastructure from floods? 8. What is the Maeslant Storm Surge Barrier notable for? 9. Has the installation of steel sheet pile walls become popular? Why?

UNIT 19

River Bank Failure

Словообразование

Суффикс **-ics**, прибавляемый к существительным, образует слова, обозначающие название наук:

linguist (лингвист) – linguistics (лингвистика).

Exercise 1. Translate the following nouns into Russian.

Strategics, aeronautics, ballistics, diplomatics, physics, dynamics.

Суффикс **-dom**, прибавляемый к существительным и к прилагательным, образует существительные, указывающие на состояние или собирательность:

bore (скучный человек) – boredom (скука).

Exercise 2. Form the new words using the suffix -ate. Translate them into Russian.

Model: free – freedom

Earl, duke, official, queen, king, czar, serf.

The Infinitive (Инфинитив)

В английском языке инфинитив (Infinitive) – это неличная форма глагола, которая обозначает действие, но не указывает на лицо и число. В русском языке английский инфинитив соответствует неопреде-

ленной форме глагола, которая отвечает на вопросы «что делать? что сделать?», например: *жить* – **to live**. Формальным признаком инфинитива является частица **to**: **to write** – *писать*.

Если перед глаголом стоит частица **to**, то это инфинитив. Отрицательная форма образуется с помощью частицы **not**, которая ставится перед инфинитивом: **not to use** – *не использовать*.

It is difficult *not to use*. – Трудно *не использовать*.

The Forms of the Infinitive (Формы инфинитива)

В английском языке инфинитив имеет 5 форм. Чтобы хорошо понять значения форм инфинитива, необходимо иметь представление о *залоге* и *временах* глагола.

Infinitive	Active	Passive
Indefinite	to help	to be helped
Continuous	to be helping	–
Perfect	to have helped	to have been helped

1. Форма *Indefinite Infinitive Active/Passive* выражает действие, одновременное с действием сказуемого:

I was glad **to see** her. – Я был рад *увидеть* ее (*Indefinite Infinitive Active*).

The child didn't like **to be washed**. – Ребенок не любил, когда его *мыли* (*Indefinite Infinitive Passive*).

2. Форма *Continuous Infinitive* подчеркивает продолжительность действия, происходящего одновременно с действием глагола-сказуемого. Эта форма употребляется только в активном залоге.

He seems **to be writing** something. – Кажется, он что-то *пишет* сейчас (*Continuous Infinitive Active*).

3. Инфинитив в форме *Perfect Infinitive Active / Passive* обозначает действие, которое предшествует действию глагола-сказуемого. На русский язык перфектный инфинитив часто переводится придаточным предложением со сказуемым, выраженным глаголом в прошедшем времени:

I was very glad **to have met** you. – Я был очень рад, что *встретил* вас (*Perfect Infinitive Active*).

The child was happy **to have been brought** to the circus. – Ребенок был счастлив, что его *привели* в цирк (*Perfect Infinitive Passive*).

The Meaning of the Forms of the Infinitive (Значение форм инфинитива)

Indefinite Active	Mary is glad to help her friend. Мери <i>(всегда)</i> рада помочь своей подруге.
Indefinite Passive	Mary is <i>(always)</i> glad to be helped . Мери <i>(всегда)</i> рада, когда ей помогают.
Continuous Active	Mary is glad to be helping her friend <i>now</i> . Мери рада, помогает своей подруге <i>сейчас</i> .
Perfect Active	Mary is glad to have helped her friend. Мери рада, что помогла своей подруге.
Perfect Passive	Mary is glad to have been helped . Мери рада, что ей помогли.

Exercise 3. Translate the following sentences paying attention to the forms of the infinitives.

1. The assistant came to instruct the students. 2. The assistant came to be instructed by the professor. 3. The young doctors were happy to have been sent to the international conference. 4. The students wanted to know English well. 5. The doctors were glad to have cured the child. 6. I am sure to have met him before. 7. I remember to have been met early. 8. Mike is happy to work and study here. 9. Henry promised to show her the town. 10. Victor remembered to have been told the news. 11. The weather seems to be improving. 12. I want to inform you of her arrival. 13. I want to be informed of her arrival. 14. I was sure to have met him before.

The Functions of the Infinitive (Функции инфинитива)

1) *подлежащее*:

To skate is pleasant. – *Кататься* на коньках приятно.

Когда инфинитив имеет при себе пояснительные слова, он обычно стоит после сказуемого. В этом случае перед сказуемым стоит местоимение **it**:

It is a pleasure *to walk* in the garden. – Приятно *гулять* в саду;

2) *именная часть составного именного сказуемого*:

Our plan is *to go* to the Crimea for the summer. – Наш план состоит в том, чтобы поехать в Крым на лето;

а) в сочетании с *прилагательными* с глаголом-связкой:

I am *happy to hear* it. – Я *счастлив слышать* это;

3) *часть составного глагольного сказуемого:*

а) в сочетании с модальными глаголами: **can (could), may (might), must, should, would**, а также с глаголами **to have** и **to be** в модальном значении:

He *can speak* English. – Он *говорит* по-английски;

б) в сочетании с глаголами, которые выражают *начало, продолжение и конец* действия: к числу таких глаголов относятся: **to begin** – *начинать*; **to start** – *начинать*; **to continue** – *продолжать*; **to stop** – *прекращать*, **to finish** – *заканчивать*;

в) в сочетании с глаголами, которые выражают отношение к действию: **to want** – *хотеть*; **to hope** – *надеяться*; **to decide** – *решать*; **to plan** – *планировать*; **to intend** – *намереваться*; **to fail** – *потерпеть неудачу*; **to manage** – *удаваться*, **to agree** – *соглашаться*; **to learn** – *научиться*; **to like** – *нравиться*; **to dislike** – *не любить*; **to help** – *помогать*; **to hate** – *ненавидеть*; **to threaten** – *угрожать*; **to promise** – *обещать*; **to try** – *стараться*; **to expect** – *надеяться*; **to offer** – *предлагать*; **to refuse** – *отказываться*;

He *continued to read* the book. – Он продолжал читать книгу;

4) *дополнение:*

I told him *to go* there. – Я сказал ему *идти* туда;

5) *определение:*

а) после *существительных*

I have no *desire to go* there. – У меня нет *желания идти* туда;

б) Инфинитив в функции определения часто встречается также после слов **the first, the second, the third, the last** и т. д.

He will be *the first to come* to the meeting. – Он *первым придет* на собрание;

в) инфинитив в функции определения употребляется также для указания назначения предмета:

He brought me *a book to read*. – Он купил мне *книгу для чтения*;

б) инфинитив употребляется в функции *обстоятельства*:

а) для выражения *цели*:

I went there *to watch* the sunrise. – Я пошел туда, чтобы *посмотреть* на восход;

б) для выражения *цели* с союзами **in order to, so as**:

I stayed there *in order (so as) to see* what would happen. – Я остался там, чтобы *видеть* что произойдет;

в) для выражения *следствия* со словами **too, enough, sufficiently**:

It is *too cold to bathe* today. – Сегодня *слишком* холодно, чтобы *купаться*.

Tom is old *enough to marry*. – Том *достаточно* взрослый, чтобы жениться;

He is *sufficiently strong to win* in this fight. – Он *достаточно* силен, чтобы победить в этом бою.

d) для выражения *сравнения* после союзов **as if, as though**:

John stopped *as if (as though)* to listen to strange noise. – Джон остановился, как будто прислушиваясь к странному шуму.

Exercise 4. Translate the following sentences into Russian and state the Infinitive functions.

1. To err is human. 2. To live is to think. 3. To explain this simple fact is not so easy. 4. It's impossible to deny this. 5. It was a great thing to live in New York. 6. To improve your writing, you must write the letters correctly. 7. I was too tired to notice it. 8. The carbon has to be obtained from the carbon dioxide in the air. 9. The box was too heavy for me to lift. 10. They helped to cook the meal. 11. Plants need light in order to survive. 12. Can you give me a book to read? 13. I couldn't run fast enough to catch up with her. 14. Snow was sufficiently encrusted to bear a pedestrian. 15. I expected to be met at the station yesterday. 16. He paused for a moment as if to arrange his thoughts. 17. The father removed his belt and raised it as though to hit the child. 18. She was the first to arrive. 19. He was the last to leave. 20. I will go to Japan next month. 21. My aim is to master English. 22. The problem was to avoid massive unemployment. 23. He went to London in order to study English. 24. Sociable people are easy to deal with. 25. His advice was hard to follow. 26. She can speak English. 27. Press Enter to start the installation.

Exercise 5. Read and memorize the following words and word combinations.

accommodate [ə'kɒmədeɪt] – выдерживать

against [ə'geɪnst] – рядом с, у

angle of repose ['æŋɡl əv rɪ'pəʊz] – угол естественного откоса

avulsion [ə'vʌljən] – авульсия, (участок суши, оторванный движением вод)

bank failure [bæŋk 'feɪljə] – обрушение берега

bank retreat [bæŋk rɪ'tri:t] – отступление берега, подмыв берега

bank zone [bæŋk zəʊn] – надводная часть (берега)

be inland [bi: 'ɪnlənd] – лежать дальше, располагаться вглубь

bend of the river [bend əv ðə 'rɪvə] – изгиб, излучина (реки)

bluff [blʌf] – крутой обрыв, отвесный берег

buildup ['bɪldʌp] – накопление
 channel ['ʃænəl] – канал, русло; сток, сточная канава
 coarse-grained soil ['kɔ:sg-reɪnd sɔɪl] – крупнозернистая почва
 cohesion [kəʊ'hi:ʒən] – связность (*грунта*)
 cohesive [kəʊ'hi:sɪv] – связный
 curvature ['kɜ:vəʃə] – изгиб, закругление
 downward ['daʊnwəd] – нисходящий
 fine-grained soil ['faɪn-'greɪnd sɔɪl] – мелкозернистая почва, мелкозём
 finer-grained ['faɪnər-'greɪnd] – более мелкозернистый
 floodplain ['flʌdpleɪn] – долина затопления, пойма реки
 force out ['fɔ:s 'aʊt] – выдавливать, вытеснять
 frictional shear strength of soil ['frɪkʃənəl ʃiə streŋθ əv sɔɪl] – прочность
 грунта на сдвиг при трении
 geotechnical failure [ˌdʒi:əu'teknɪkəl 'feɪljə] – геотехническое обруше-
 ние берега
 gravitational force [ˌgrævɪ'teɪʃənəl fɔ:s] – сила тяжести
 helical motion ['helɪkəl 'məʊʃən] – винтообразное движение, спирале-
 видное движение
 high stand [haɪ stænd] – высокий уровень воды
 internal friction [ɪn'tɜ:nəl 'frɪkʃən] – внутреннее трение
 internal shear [ɪn'tɜ:nəl ʃiə] – глубинный сдвиг
 liquefaction [lɪkwɪ'fækʃn] – разжижение грунтов
 lobe [ləʊb] – выступ (*криволинейной или круглой формы*)
 natural levee ['nætʃərəl 'levi] – естественный береговой вал
 outer edge ['aʊtə edʒ] – внешняя сторона (кромка)
 outside bend [ˌaʊt'saɪd bend] – внешний изгиб
 overbank area ['əʊvə, bæŋk 'eəriə] – прибрежная зона, пойма
 overhang ['əʊvəhæŋ] – свес, выступ
 oversteepen [əʊvə'sti:pən] – становиться очень крутым (*об откосе*)
 plane [pleɪn] – плоскость
 pore water pressure [pɔ: 'wɔ:tə 'preʃə] – гидростатическое поровое
 давление
 powerline crossing ['paʊə,lain 'krɒsɪŋ] – переход воздушной ЛЭП в
 кабель
 rolling ['rəʊlɪŋ] – вращательный
 sediment ['sedɪmənt] – осадочная порода, отложение
 shallow failure [ʃæləʊ 'feɪljə] – поверхностное обрушение
 sliding force ['slaɪdɪŋ fɔ:s] – сила трения скольжения

slope [sləʊp] – откос, уклон, крутизна
 strength [streŋθ] – прочность
 stress [stres] – напряжение, нагрузка
 susceptible [sə'septəbl] – подверженный
 tectonic activity [tek'tɒnɪk æk'tɪvəti] – тектоническая активность
 tectonic shift [tek'tɒnɪk ʃɪft] – тектонический сдвиг
 tectonics [tek'tɒnɪks] – тектонические процессы
 tight bend [taɪt bend] – крутой изгиб
 toe zone [təʊ zəʊn] – подводная часть (*берега*)
 viscous ['vɪskəs] – вязкий (*о жидкости*)
 weight [weɪt] – нагрузка
 wet earth flow [wet 'ɜ:θfləʊ] – поверхностный оползень, оплывина

Exercise 6. Read and translate the following text.

River **bank failure** can be caused when the **gravitational forces** acting on a bank exceed the forces which hold the **sediment** together. It also may be caused by house placement, water saturation, **weight** on the river bank, vegetation, and/or **tectonic activity**. A river bank can be divided into three zones: **toe zone**, **bank zone**, and **overbank area**. The toe zone is the area which is most **susceptible** to erosion. Because it is located in between the ordinary water level and the low water level, it is strongly affected by currents and erosional events. The bank zone is above the ordinary high water level, but can still be effected periodically by currents. The overbank area is **inland** of both the toe and bank zones, and can be classified as either a **floodplain** or a **bluff**, depending on its **slope**.

Toe zone erosion occurs when flow is in the direction of a bank at the **bend of the river** and the highest velocity is at the **outer edge** and in the center depth of the water. Centrifugal forces raise the water elevation so that it is highest on the **outside bend**, and as gravity pulls the water downward, a **rolling, helical motion** happens, with **downward** velocities **against** the bank. It will be highest in **tight bends**. The worst erosion will be immediately downstream from the point of maximum **curvature**. This then causes an **overhang** eventually resulting in **bank retreat** and failure.

Geotechnical failure usually occurs due to **stresses** on the bank exceeding the forces the bank can **accommodate**. **Pore water pressure** in the saturated bank reduces the **frictional shear strength** of the soil and increases **sliding forces**. This type of failure is most common in **fine-grained soils** because they cannot drain as rapidly as **coarse-grained soils**. Subsurface moisture weakens **internal shear**. Capillary action can also decrease the

angle of repose of the bank to less than the existing bank slope. This **oversteepens** the slope and can lead to collapse when the soil dries.

Tectonic shift may cause river bank failure, resulting in hazards to people living near to the river and to structures such as bridges, pipelines, and **powerline crossings**. Bank failure as the result of **tectonics** may also lead to **avulsion**, in which a river abandons its own river **channel** in favor of forming a new one. Avulsion due to tectonics is most common in rivers having a **high stand**, in which bank failure has led to a loss of **natural levees** due to **liquefaction** and fractures from an earthquake.

Shallow failure occurs where a layer of material moves along **planes** parallel to bank surfaces. Failure is typical of soils with low **cohesion**, and occurs when the angle of the bank exceeds the angle of **internal friction**. Small to medium-sized blocks are **forced out** near the river bank zone due to excessive pore water pressure. Failure is usually associated with steep banks and saturated **finer-grained cohesive** bank materials that allow **buildup** of positive pore water pressure and strong seepage within structure.

Wet earthflow occurs where the loss of strength of a section of bank due to saturation increases the weight of the bank and decreases the banks material **strength** so that the soil flows as a **viscous** liquid. This type of failure usually occurs on low angle banks and the affected material flows down the bank to form **lobes** of material at the toe.

Exercise 7. Say whether the following statements are true or false. Correct the false ones using the text.

1. A river bank can be divided into three zones. 2. The bank zone is cannot be effected by currents whatsoever. 3. The worst erosion will be from the point of maximum bank curvature. 4. Pore water pressure in the saturated bank reduces sliding forces. 5. Avulsion due to tectonics is most common in rivers having a low stand. 6. Small to medium-sized blocks are forced due to pore water pressure. 7. Failure is associated with steep banks and saturated coarse-grained cohesive bank materials.

Exercise 8. Translate the following words and word combinations into Russian.

River bank failure; gravitational forces; sediment; tectonic activity; toe zone; bank zone; overbank area; susceptible to erosion; floodplain; bluff; slope; bend of the river; outer edge; outside bend; curvature; helical motion; tight bends; bank retreat; accommodate; avulsion; pore water pressure; frictional shear strength; sliding forces; channel; coarse-grained soils; internal shear; angle of repose; result of tectonics; liquefaction; cohesion; buildup.

Exercise 9. Match the words with their definitions.

- | | |
|---------------|---|
| 1. slope | a) the state of being saturated or the action of saturating. |
| 2. river | b) a steady and continuous flowing movement of some of the water in a river, lake, or sea. |
| 3. soil | c) a surface of which one end or side is at a higher level than another; a rising or falling surface. |
| 4. pressure | d) the land alongside or sloping down to a river or lake. |
| 5. current | e) a minute opening in a surface through which gases, liquids, or microscopic particles may pass. |
| 6. saturation | f) the substance on the surface of the earth in which plants grow. |
| 7. pore | g) a large natural stream of water flowing in a channel to the sea, a lake, or another river. |
| 8. bank | h) continuous physical force exerted on or against an object by something in contact with it. |

Exercise 10. Translate the expressions into Russian paying attention to the prepositions.

1. Gravitational forces acting **on** a bank; 2. Toe zone is affected **by** currents; 3. Flow is **in** the direction **of** a bank; 4. Point **of** maximum curvature; 5. Strong seepage **within** structure; 6. Liquefaction and fractures **from** an earthquake; 7. Bank failure may lead **to** avulsion; 8. Failure is associated **with** steep banks; 9. Lobes **of** material **at** the toe.

Exercise 11. Translate the following words and word combinations into English using the text.

Расположение дома; водонасыщенность; берег реки; обычный уровень воды; низкий уровень воды; в направлении берега; самая высокая скорость; центробежные силы; точка максимальной кривизны; подповерхностная влага; капиллярное действие; уклон берега; вызвать обрушение берега реки; переход воздушной ЛЭП в кабель; мосты; трубопроводы; слой материала; угол наклона берега; блоки среднего размера; положительное поровое давление воды; сильное просачивание; вязкая жидкость; участок берега; поверхностный оползень.

Exercise 12. Answer the following questions.

1. When can a river bank failure happen? 2. How can a river bank be divided? 3. How can centrifugal forces influence the water? 4. Where will the worst erosion appear immediately? 5. Is pore water pressure significant for river bank failure? 6. What hazards can tectonic shift result in? 7. What happens in case of avulsion appearing as a result of tectonics? 8. Where does shallow failure occur? 9. Why are small to medium-sized blocks forced out? 10. Why does wet earthflow occur?

UNIT 20

River Bank Protection Measures

The Complex Subject (Субъектный инфинитивный оборот)

Субъектный инфинитивный оборот (The Complex Subject), или сложное подлежащее, состоит из *существительного или личного местоимения* в именительном падеже и *инфинитива*, обозначающего действие. Эта конструкция разделена на две части *глаголом-сказуемым* в личной форме, который используется в *страдательном* или в *действительном залоге*. На русский язык данный оборот переводится сложноподчиненным предложением с вводными словами (*говорят, известно, что; по-видимому* и др.)

подлежащее	сказуемое	инфинитив	второстепенные члены предложения
Tom	is said	to be	ill.
<i>Говорят, что Том болен.</i>			
Mike	is seen	to enter	the house.
<i>Видно, как Майк входит в дом.</i>			
Her cousin	appeared	to forget	her phone number.
<i>Видимо, ее двоюродный брат забыл ее номер телефона.</i>			

В *страдательном* залоге данный оборот употребляется:

1) с глаголами *сообщения*:

to announce – объявлять

to describe – описывать

to report – сообщать

to say – говорить

to state – заявлять.

They are reported to arrive in two days. – *Сообщают, что* они придут через два дня;

2) с глаголами *мышления* (*мнение, предположение, надежда*):

to believe – полагать

to consider – считать

to expect – ожидать

to know – знать

to suppose – предполагать

to think – думать

to understand – понимать.

Dick is known to be a good writer. – Известно, что Дик хороший писатель;

3) с глаголами *чувственного восприятия*:

to see – видеть

to hear – слышать

to feel – чувствовать

to notice – замечать

to observe – замечать

to watch – наблюдать.

Birds were heard to sing in the garden. – Было слышно, как птицы поют в саду;

4) с глаголом-сказуемым в *действительном залоге*:

to seem – казаться

to prove – оказаться

to turn out – оказаться

to happen – случаться

to chance – случаться

to appear – казаться.

She happened to be there when the police arrived. – Она случайно оказалась там, когда прибыла полиция;

5) с глаголом-сказуемым, выраженным прилагательным с глаголом-связкой:

to be likely – вероятно

to be unlikely – маловероятно

to be sure – безусловный.

to be certain – наверняка.

He is likely to come. – Вероятно, он придет.

Exercise 1. Translate the following sentences paying attention to the Complex Subject.

1. They are expected to come to our city tomorrow. 2. He seems to know very little about research work. 3. The doctor was expected to come in the evening. 4. They are said to know English very well. 5. She is believed to be working in Germany now. 6. You are supposed to graduate in four years. 7. The delegation is reported to have left for England. 8. The sawmill is known to produce good quality products. 9. They are known to have been good friends for many years. 10. This department store is considered to be the most popular store in the town. 11. This text happened to be very difficult for translation. 12. He was seen to leave Moscow on Friday afternoon. 13. The number of the unemployed is reported to have increased. 14. Ted was known to be a clever and hard-working student. 15. This device ap-

peared to be very effective. 16. The new type of fuel was thought to be very expensive. 17. He appeared to be a good friend to all of us. 18. The equipment seemed to be in a very good condition. 19. The office turned out to be quite close. 20. They were sure to come to an agreement. 21. He is said to be very ill. 22. All our efforts proved to be useless. 23. He is likely to arrive in the evening. 24. She seemed to like her job.

The Complex Object (Объектный инфинитивный оборот)

Объектный инфинитивный оборот (The Complex Object), или сложное дополнение, состоит из *существительного* или *личного местоимения* в *объектном падеже* (*me, him, her, it, us, you, them*) и *инфинитива* и употребляется лишь после глаголов, выражающих желание, восприятие, предположение, приказание, просьбу:

подлежащее	сказуемое	оборот «сложное дополнение»	второстепенные члены предложения
Mary	wants	them to read	this book.
Мэри	хочет,	чтобы они прочитали	эту книгу.
We	heard	our friends come back	in the evening.
Мы	услышали,	что наши друзья вернулись	вечером.

I. Данный оборот с инфинитивом с частицей **to** употребляется:

1) после глаголов, выражающих *желание, чувства, намерение*:

to desire – желать

to hate – ненавидеть

to like – любить, нравиться

to dislike – не нравиться

to love – любить

to prefer – предпочитать

to want – хотеть

to wish – желать

would/should like – желать.

I should like *us to be invited* to the conference. – Я хотел бы, *чтобы нас пригласили* на конференцию;

2) после глаголов, выражающих *умственную деятельность*. В этой роли над всеми этими глаголами витает общее значение – *полагать, предполагать, считать*.

to believe – полагать

to consider – считать

to declare – заявлять
to expect – ожидать
to find – обнаруживать
to know – знать
to remember – помнить
to suppose – полагать
to think – думать
to understand – понимать.

We know him to be a good artist. – Мы знаем, *что он* хороший художник;

3) После глаголов, выражающих *побуждение* (*приказ, просьбу, разрешение, предупреждение*):

to advise – советовать
to allow – позволять
to ask – просить
to command – приказывать
to force – принуждать
to order – приказывать
to permit – разрешать
to recommend – рекомендовать
to request – просить
to tell – велеть
to warn – предупреждать.

I ask you not to be late this time. – Я прошу вас не опаздывать на этот раз.

II. Объектный инфинитивный оборот с инфинитивом без частицы **to** употребляется:

1) после глаголов: **to make** – *заставлять*, **to let** – *позволять*.

They made her come. – Они заставили ее прийти.

Let me know when you are ready. – Дай мне знать, когда будешь готов;

2) После глаголов, выражающих *восприятие* при помощи органов чувств. Как правило, переводятся глаголами совершенного вида:

to feel – чувствовать
to hear – слышать
to notice – замечать
to observe – наблюдать
to see – видеть
to watch – наблюдать.

I never saw him cry. – Я никогда не видел, *чтобы он* плакал.

Exercise 2. Translate the following sentences paying attention to the Complex Object.

A. 1. He wanted us to visit the art exhibition. 2. I expect you to tell me everything. 3. I suppose her to be about 50. 4. The teacher does not consider him to be a good student. 5. The engineer expected the work to be done in time. 6. We expect you to show good results. 7. The discovery showed the atomic nucleus to be a vast source of energy. 8. We know him to have graduated from the Institute two years ago. 9. Everybody knows him to be writing a new book. 10. We know cybernetics to be an important branch of modern technology. 11. We thought him to have taken part in their experiment. 12. Did you want the plan to be improved?

B. 1. We saw them play football. 2. I felt my hands tremble. 3. I heard him speak at the meeting. 4. They didn't see him enter the room. 5. We saw an old woman fall in the street. 6. Did you see the stranger go out? 7. We noticed the boy hide something in his pocket. 8. The policeman saw the woman pick up something from the floor. 9. The football fans saw the player take the ball and score the first goal. 10. The young mother watched her son play on the sand near the river. 11. The teacher let us use dictionaries at the test. 12. Let us go and have a cup of tea. 13. Mother made her sons clean their room.

Exercise 3. Read and memorize the following words and word combinations.

aggregate ['ægrɪgət] – заполнитель
blocky ['blɒki] – глыбистый
broken soil-cement ['brəʊkən sɔɪl-sɪ'ment] – дробленый цементогрунт
bundle ['bʌndl] – связка, вязанка
burlap ['bɜːləp] – джутовая, мешочная ткань
cottonwood ['kɒtənwʊd] – тополь трехгранный
crown [kraʊn] – гребень
cubical ['kjuːbɪkəl] – имеющий форму куба
culvert ['kʌlvət] – водопропускная труба, кульверт
cuttings ['kʌtɪŋz] – прутья, черенки
elevation [ˌelɪ'veɪʃən] – высотная отметка
elongated ['iːlɒŋɡetɪd] – продолговатый
eroding bank line [ɪ'rəʊdɪŋ bæŋk laɪn] – размываемая линия берега
face [feɪs] – сталкиваться (*с проблемой, с трудностью*)
fascine [fæ'siːn] – фашина (*туго стянутая связка хвороста*)
fill material [fɪl mə'tɪəriəl] – заполняющий материал
gabion ['geɪbɪən] – габион

granite ['grænɪt] – гранит
 in anticipation [ɪn æn.tɪsɪ'peɪʃən] – в ожидании
 launch down [lɔːnʃ daʊn] – спускаться
 log-like structure [lɒg-laɪk 'strʌktʃə] – бревенчатая конструкция
 longitudinal stone toe [ˌlɒndʒɪ'tjuːdɪnəl stəʊn təʊ] – продольный ка-
 менно-набросной вал
 modular concrete block ['mɒdʒələ 'kɒŋkri:t blɒk] – модульный бетон-
 ный блок
 plant coverage [plɑːnt 'klʌvərɪdʒ] – растительное покрытие
 pole [pəʊl] – столб, опора
 revetment [rɪ'vetmənt] – защитная облицовка, защитное покрытие
 riprap ['rɪpræp] – каменная наброска, отсыпь
 riverward ['rɪvəwəd] – по направлению к реке
 rubble ['rʌbl] – бут, бутовый камень
 sack [sæk] – мешок
 stack [stæk] – складывать в штабель, укладывать друг на друга
 stone toe [stəʊn təʊ] – каменное основание
 streambed ['striːmbɛd] – русло реки
 structure ['strʌktʃə] – зд. конструкция
 tetrapod ['tetrə,pɒd] – тетрапод
 trench-fill revetment ['trench-fɪl rɪ'vetmənt] – берегоукрепление тран-
 шейного типа
 well below [wel brɪ'ləʊ] – значительно ниже
 willow ['wɪləʊ] – ива
 wire ['waɪə] – проволочный

Exercise 4. Read and translate the following text.

River bank failure is the most common problem faced in river protection measures in many countries. So bank failure control is very important to save agricultural land, property and infrastructures like bridges, **culverts**, buildings etc. located alongside the rivers. Numerous methods are available to control bank failure. The most common are **riprap**, **trench-fill revetment**, **longitudinal stone toe**, **sacks**, **gabions** and **vegetation**.

Riprap made of rocks and other materials to inhibit erosional processes on a river bank. Common rock types used include **granite** and **modular concrete blocks**. **Rubble** from building and paving demolition is used as well as specifically designed **structures** called **tetrapods** or similar concrete blocks. Riprap should be **blocky** in shape rather than **elongated**, as more nearly **cubical** stones are more resistant to movement.

A *trench-fill revetment* is simply a stone revetment with a massive **stone toe**. It is normally constructed in an excavated trench behind the river bank,

in anticipation that the river will complete the work by eroding to the revetment, causing the stone toe to **launch down** and protect the bank slope. Material other than stone, such as **broken soil-cement**, has been used successfully and may be less costly than stone, but careful design of the soil/cement mixture and placing operation is required.

Longitudinal stone toe is another form of a river bank protection, with the stone placed along the existing **streambed** rather than on top bank. The longitudinal stone toe is placed with the **crown well below** the top of the bank, and either against the **eroding bank line** or at a distance riverward of the high bank. Typical crown **elevations** may vary but are commonly between 1/3 and 2/3 of the height to top bank.

Sacks as a revetment material can be considered to be artificial “rocks” of uniform size and shape. The sacks may be made of paper, **burlap**, or a synthetic material. The fill material may be soil or **aggregate** of various types, with or without cement.

Gabions are **stacked**, rectangular **wire** boxes filled with stones. They are useful on steep slopes when the water is too fast for the use of a riprap technique. They are expensive and labor-intensive, as well as require periodical inspection for damage and subsequent maintenance, though they have been seen to demonstrate positive performance.

There are three main types of *vegetation* to prevent bank failure: trees, shrubs and grasses. Trees will provide for deep and dense root systems increasing the stresses that a river bank will accommodate. Shrubs are used to provide a protective covering against erosion, creating good plant coverage and soil stability. **Cuttings** may be tied together into **fascines**, and placed into shallow trenches parallel to the bank of the river. Typically, **willows** and **cottonwood poles** are the most useful materials. These **bundles** of cuttings create **log-like structures** which will root, grow, and create good **plant coverage**. The grass holds the soil in place and protects the bank from the stream erosion.

Exercise 5. Translate the words and word combination in brackets into English using the text.

1. (Разрушение берега реки) is the most common problem (с которой сталкиваются) in river protection measures (во многих странах).

2. (Каменная наброска) should be (глыбистый по форме) rather than elongated, as more nearly (камни, имеющие форму куба) are more resistant to movement.

3. Typical (высотная отметка гребня) may vary but are commonly between 1/3 and 2/3 of the (высоты до верхнего края берега).

4. The (заполняющий материал) may be soil or aggregate of various types, (с или без цемента).

5. (Прутья) may be tied together into (фашины), and placed into (неглубокие траншеи) parallel to the bank of the river.

Exercise 6. Translate the following words and word combinations into Russian.

Culverts; riprap; trench-fill revetment; stone revetment; vegetation; longitudinal stone toe; sacks; gabions; granite; revetment material; modular concrete blocks; uniform size and shape; rubble; tetrapods; stone toe; broken soil-cement; eroding bank line; paper; burlap; synthetic material; wire boxes; willows; cottonwood poles; soil stability; bundles of cuttings; log-like structures; plant coverage; periodical inspection; stream erosion.

Exercise 7. Make up word combinations using the text and translate them.

- | | |
|----------------|--------------------|
| 1. excavated | a) failure control |
| 2. positive | b) methods |
| 3. soil/cement | c) processes |
| 4. concrete | d) blocks |
| 5. bank | e) trench |
| 6. numerous | f) mixture |
| 7. protective | g) material |
| 8. erosional | h) performance |
| 9. synthetic | i) covering |

Exercise 8. Translate the following words and word combinations into English using the text.

Сельскохозяйственные угодья; недвижимость; инфраструктура; наброска, выполненная из камней; распространенные типы пород; разрушение дорожных покрытий; за берегом реки; защищать береговой откос; дешевле, чем камень; камни одинакового размера и формы; крутые склоны; трудоемкий; метод крепления откосов каменной наброской; последующее техническое обслуживание; деревья; кустарники; травы; плотные корневые системы; защитное покрытие.

Exercise 9. Answer the following questions.

1. What methods are available to control bank failure? 2. What materials are used to inhibit erosional processes on a river bank? 3. Where is a trench-fill revetment normally constructed? 4. Where is the longitudinal stone toe usually placed? 5. What aggregate can be used in sacks as a revetment material? 6. Where are gabions stacked? 7. What are three main types of vegetation to prevent bank failure? 8. What will the bundles of cuttings create?

UNIT 21

Sewage System

The Gerund (Герундий)

Герундий – это неличная форма глагола, которая выражает название действия и сочетает в себе признаки глагола и существительного. Герундий образуется путем прибавления к основе глагола в неопределенной форме окончания -ing: to read – **reading**.

Так как формы, аналогичной герундию, в русском языке нет, то переводить герундий можно по-разному:

1. Reading helps you learn English. – Чтение помогает вам изучать английский язык.

2. She enjoys driving a car. – Ей доставляет удовольствие водить машину.

3. He entered the room without saying “hello”. – Он вошел в комнату, не сказав «привет».

4. Do you remember taking your final exam? – Вы помните, как вы сдавали выпускной экзамен?

5. Thank you for coming. – Спасибо, что пришли.

The Forms of the Gerund (Формы герундия)

	Active	Passive
Indefinite (Simple)	writing	being written
Perfect	having written	having been written

Простая форма герундия (Indefinite or Simple Gerund) обозначает действие, которое происходит одновременно с действием глагола-сказуемого:

He likes telling fairy tales. – Он любит рассказывать сказки.

He likes being told fairy tales. – Он любит, чтобы ему рассказывали сказки.

Перфектная форма герундия (Perfect Gerund) обозначает действие, которое предшествует действию глагола-сказуемого:

He is proud of *having spoken* to this famous person. – Он гордится, что *поговорил* с этим знаменитым человеком.

He is proud of *having been spoken to*. – Он гордится, что *с ним поговорили*.

The Functions of the Gerund (Функции герундия в предложении)

Ввиду того что герундий является чем-то средним между английским глаголом и существительным, он может принимать на себя различные функции в предложениях. Он может быть *подлежащим, дополнением, обстоятельством, определением*:

1) функция *подлежащего*:

Running is very useful. – *Бег* очень полезен.

Герундий, выполняющий функцию подлежащего, может стоять после сказуемого. В этом случае перед сказуемым стоит формальное подлежащее **it**:

It is (of) no use, it is useless, it is no good – бесполезно, **it is worth while** – стоит (потраченного времени):

It's no use *talking* about it. – Бесполезно *говорить* об этом;

It's no good *doing* the same all the time. – Нет ничего хорошего в том, чтобы делать одно и то же все время.

2) функция *предложного дополнения*:

He is fond of *swimming*. – Он обожает *купание*

В функции *предложного дополнения* употребляется после глаголов с предлогами, чаще **of, for, in** и др. Например:

to agree on/to – соглашаться с

to complain of – жаловаться на

to consist in – заключаться в

to count on/upon – рассчитывать на

to depend on – зависеть от

to feel like – хотеть, собираться

to hear of – слышать о

to insist on – настаивать на

to keep from – удерживать(ся) от

to look forward to – предвкушать

to object to – возражать против

to persist in – упорно продолжать

to result in – иметь результатом

to succeed in – удаваться

to suspect of – подозревать в

to thank for – благодарить за

to think of – думать о

3) функция *прямого дополнения*:

He avoided *looking* at us. – Он избегал *смотреть* на нас.

В данной функции герундий употребляется в качестве *прямого дополнения* после ряда глаголов:

to admit – допускать, признавать

to avoid – избегать

to delay – откладывать

to deny – отрицать, отвергать

to dislike – не нравиться

to enjoy – наслаждаться, нравиться

to escape – убегать

to excuse – извинять(ся)

to finish – закончить

to forgive – прощать, извинять

to imagine – воображать

to mention – упоминать

to mind – возражать (в вопросах и отрицаниях)

to postpone – откладывать

to risk – рисковать

to stop – прекращать

to suggest – предлагать.

С глаголом **to go** герундий используется в некоторых характерных сочетаниях:

to go fishing – ходить на рыбалку

to go dancing – заниматься танцами

to go shopping – ходить за покупками

to go skating – кататься на коньках

to go swimming – заниматься плаванием

to go walking – ходить на прогулку;

4) функция *обстоятельства времени* после союзов **after, before, on**:

After coming home he drank a cup of tea. – По *возвращении* домой он выпил чашку чая;

5) функция *обстоятельства образа действия* с предлогом **by**:

By doing that you'll save a lot of time. – *Поступая так*, ты сэкономишь массу времени;

6) функция *сопутствующих обстоятельств* с предлогами **without, besides, instead of**:

Mr Brown went out without saying a word. – М-р Браун вышел, не сказав ни слова.

Instead of stopping the rain increased. – Вместо того чтобы *прекратиться*, дождь усилился;

7) функция *обстоятельства цели* с составными предлогами **for the purpose of, with the object of, with a view to**:

Tom came to Moscow with the object of buying a car. – Том приехал в Москву для того, чтобы купить автомобиль;

8) функция *части составного именного сказуемого*:

My mother's hobby is making cakes. – Хобби моей матери – *делать* торты;

9) функция *определения*:

I like her manner of speaking. – Мне нравится её манера *говорения*.

В роли определения герундий обычно стоит после поясняемого существительного с различными предлогами, чаще с **of, for, in, at, about** и **to**:

apology for – извинение

art of – искусство

astonishment at – удивление

chance of – шанс, возможность

disappointment at – разочарование

experience in – опыт

fear of – страх

habit of – привычка

hope of – надежда на

idea of – идея, мысль о

interest in – заинтересованность в

plan for – план

pleasure of – удовольствие

possibility of – возможность

preparation for – приготовление

reason for – причина, основание для

right of – право на

skill in – мастерство

surprise at – удивление

thought of – мысль о

way of – способ, путь.

Exercise 1. Translate the following sentences into Russian.

1. The dishes are dirty. They need washing. 2. She disliked living in her old house. 3. She was thinking of buying a new one at the seaside. 4. The story was funny. He couldn't help laughing. 5. I'm used to jogging in the morning. 6. Usually she enjoyed talking to them and didn't mind helping them. 7. On reading the letter Tom hid it. 8. But she doesn't like washing and ironing. 9. John, avoid driving in rainy weather! 10. She doesn't mind working a lot, you know. 11. She enjoys driving an expensive car. 12. She has always dreamt of travelling round the world. 13. The exhibition is worth visiting. 14. She has risen to be head of the company in spite of being a woman in a man's world. 15. She loves meeting people because she can't bear being alone at all. 16. You can't do this work without getting your clothes dirty. 17. She enjoys being photographed because she thinks she's beautiful. 18. She hates being laughed at. 19. She likes being stared at because she thinks she's attractive. 20. But she hates being ignored. 21. I was tired of being a bookkeeper. 22. Let him go on reading.

Exercise 2. Use the Gerund in the Passive Voice paying attention to the model.

Model: I like *visiting* other people. – I like *being visited* by other people.

1. I don't mind sending him there. 2. I'm looking forward to showing them the place. 3. I remember asking him for help. 4. He was tired of asking questions. 5. I avoid visiting strangers. 6. The manager objects to reading this regulation. 7. They insist on letting him in. 8. Do you mind telling us how to do it? 9. I avoid asking for help. 10. Why are you afraid of asking him questions? 11. I don't mind leaving him alone. 12. Why do you object to showing them the letter?

Exercise 3. Transform the sentences using the Gerund according to the model.

Model: I want to get this information. I'm interested in it. I'm interested *in getting* this information.

1. Steve has a dream. He wants to have a house in the country. 2. Let's phone him at once. I insist on it. 3. Why must we go there? What's the use of it? 4. I often eat at restaurants. I'm fond of it. 5. We'll meet him soon and we are looking forward to it. 6. Mark couldn't hurt the child. He is incapable of it. 7. I don't ride my bike in the park any more. I've given it up. 8. Let's go by plane. I don't object. 9. Susan can't stay here anymore. She is tired. 10. Barbara likes playing tennis. She is fond of it.

Exercise 4. Choose the correct preposition.

1. Read the rule ... writing the exercise. (*after, before, by the time*)
2. Diana is fond ... collecting posters of pop singers. (*for, to, of*)

3. Betty likes art and she is keen ... visiting art galleries. (*in, on, about*)
4. Black is tired ... painting the wall. He has been working for 5 hours. (*of, after, for*)
5. Susan is clever ... learning English. (*of, for, at*)
6. I don't understand how David can fish for hours ... catching anything. (*with, without, on*)
7. Kate bought a book ... buying an umbrella. (*but, without, instead of*)
8. ... visiting the British Museum the tourists were very much impressed. (*After, Before, Instead of*)
9. I can't get used ... getting up early. (*for, with, to*)
10. ... hearing the news Mr White felt pleased. (*On, With, By*)
11. We were fascinated ... Ella's singing Russian songs. (*by, about, on*)
12. I like the idea ... visiting St. Petersburg this summer. (*of, to, about*)
13. Jack answered the examiners' questions ... thinking and later he regretted it. (*without, instead of, with*)
14. Thank you ... helping us In troubles. (*about, by, for*)
15. My friends and I dream ... going to England. (*to, of, for*)
16. Children went out ... switching off the light. (*with, without, before*)
17. We were surprised ... meeting Alice at the theatre. She was going to stay at home on that day. (*by, at, with*)
18. Sorry ... interrupting you, but could you show me the way to the nearest cinema? (*at, for, of*)
19. We have improved our English ... learning the new words and rules every day. (*by, for, with*)
20. Pamela is looking forward ... visiting London again. (*to, on, about*)

Exercise 5. Put the infinitives in brackets in the Gerund Active or Passive.

1. Why do you avoid (speak) to me? 2. Barbara tried to avoid (speak) to.
3. The doctor insisted on (send) the sick man to hospital. 4. The child insisted on (send) home at once. 5. Do you mind his (examine) by a heart specialist? 6. He showed no sign of (recognize) me. 7. She showed no sign of (surprise).
8. He had a strange habit of (interfere) in other people's business. 9. I was angry at (interrupt) every other moment. 10. Donald was always ready for (help) people. 11. Dick was very glad of (help) in his difficulty.
12. On (allow) to leave the room the children immediately ran out into the yard and began (play). 13. In (make) this experiment they came across some very interesting phenomena. 14. The results of the experiment must be checked and re-checked before (publish).
15. The doctor insisted on (send) the sick man to hospital. 16. He was good at (repair) cars. 17. She was sorry

for (come) late. 18. The children ran out the room and began (play).
19. He seemed sorry for (be) rude. 20. The girl had no talent for (dance).
21. After (check) the students' papers, the teacher handed them back.
22. Excuse her for (break) her cup.

Exercise 6. Read and memorize the following words and word combinations.

appurtenance [ə'pɜ:tɪnəns] – вспомогательное сооружение
asbestos cement [æz'bestɒs sə'ment] – асбестоцемент
basin ['beɪsn] – резервуар
carry ['kæri] – зд. отводить
catch basin [kætʃ 'beɪsn] – водосборный бассейн
collector sewer [kə'lektə 'seɪə] – магистральный канализационный коллектор
combined sewage [kəm'baɪnd 's(j)u:ɪdʒ] – смешанные сточные воды
combined sewer [kəm'baɪnd 'seɪə] – канализационный коллектор смешанного типа (*для ливневых и коммунально-бытовых сточных вод*)
combined sewer overflow [kəm'baɪnd 'seɪə 'əʊvəfləʊ] – переполнение комбинированных канализационных систем
convey [kən'veɪ] – отводить, доставлять; транспортировать
corrugated ['kɒrəgeɪtɪd] – гофрированный
detention basin [dɪ'tenʃən 'beɪsn] – водохранилище с регулируемым выпуском
disinfection [,dɪsɪn'fekʃən] – дезинфекция, обеззараживание
disposal [dɪs'pəʊzəl] – утилизация
domestic sewage [də'mestɪk 's(j)u:ɪdʒ] – бытовые сточные воды
ductile iron ['dʌktail 'aɪən] – чугун с шаровидным графитом
facilities [fə'sɪlətɪz] – сооружения
flush [flʌʃ] – прилив, быстрый приток
force main [fɔ:s meɪn] – напорный магистральный трубопровод; магистраль нагнетания
industrial sewage [ɪn'dʌstriəl 'sju:ɪdʒ] – промышленные сточные воды
inlet ['ɪnlet] – зд. дождеприёмник
interceptor [,ɪntə'septə] – коллектор для сточных вод, подающий сточные воды к очистной станции
intermittent [,ɪntə'mɪtənt] – периодический, прерывистый
lateral ['lætərəl] – поперечный трубопровод (*ответвление*)
magnitude ['mæɡnɪtju:d] – величина
peak flow-rate [pi:k 'fləʊ-reɪt] – максимальная скорость течения
precast section [,pri:'kɑ:st 'sekʃən] – сборная секция

pretreated industrial wastewater ['pri:'tri:tɪd m'dʌstriəl 'weɪstwɔ:tə] –
 предварительно очищенные промышленные сточные воды
 receiving body of water [rɪ'si:vɪŋ 'bɒdɪ əv 'wɔ:tə] – водоприёмник
 runoff ['rʌnɒf] – поверхностный сток
 sanitary sewage ['sænɪtəri 's(j)u:ɪdʒ] – коммунально-бытовые сточные
 воды
 sanitary sewerage system ['sænɪtəri 'su:ɪdʒ 'sɪstəm] – система бытовой
 канализации
 sanitary sewers ['sænɪtəri 'səuəz] – система канализации для бытовых
 сточных вод
 settling ['setlɪŋ] – отстаивание
 sewage ['s(j)u:ɪdʒ] – сточные воды
 sewage treatment plant ['s(j)u:ɪdʒ 'tri:tmənt plɑ:nt] – станция очистки
 сточных вод
 sewer ['s(j)uə] – канализационная труба
 sewerage facilities ['s(j)u:əɪdʒ fə'sɪlətɪz] – канализационная сеть
 sewerage system ['s(j)u:əɪdʒ 'sɪstəm] – канализационная система
 storm sewage [stɔ:m 's(j)u:ɪdʒ] – ливневые сточные воды
 storm sewer [stɔ:m 's(j)uə] – канал для ливневых вод в раздельной
 системе канализации
 storm water [stɔ:m 'wɔ:tə] – ливневая вода
 submain ['sʌb,meɪn] – коллектор канализации, принимающий сточ-
 ные воды от нескольких зданий
 swirl concentrator [swɜ:l 'kɒnsəntreɪtə] – вихревой концентратор
 tie into [taɪ 'ɪntu:] – подключаться к
 treatment ['tri:tmənt] – очистка
 trunk line [trʌŋk laɪn] – магистральный трубопровод
 vitrified clay ['vɪtrɪfaɪd kleɪ] – плотноспекшаяся глина, керамика
 vortex effect ['vɔ:teks ɪ'fekt] – вихревой эффект
 wastewater collection system ['weɪstwɔ:tə kə'leɪkʃən 'sɪstəm] – система
 сбора сточных вод
 wastewater treatment plant ['weɪstwɔ:tə 'tri:tmənt plɑ:nt] – водоочист-
 ная станция
 whirlpool effect ['wɜ:lpu:l ɪ'fekt] – эффект водоворота

Exercise 7. Read and translate the following text.

A **sewerage system** or **wastewater collection system** is a network of pipes, pumping stations and **appurtenances** that **convey sewage** from its points of origin to a point of **treatment** and **disposal**. There are three types of wastewater or sewage: **domestic sewage**, **industrial sewage**, and **storm**

sewage. Domestic sewage carries used water from houses and apartments; it is also called **sanitary sewage**. Industrial sewage is used water from manufacturing or chemical processes. Storm sewage or **storm water** is **runoff** from precipitation that is collected in a system of pipes or open canals.

Systems that carry a mixture of both domestic sewage and storm sewage are called **combined sewers**. Combined sewers typically consist of large-diameter pipes or tunnels, because of the large volumes of storm water that must be carried during wet-weather periods. They are very common in older cities but are no longer designed and built as part of new **sewerage facilities**. In some large cities the **combined sewer overflow** problem has been reduced by diverting the first **flush of combined sewage** into a large **basin** or underground tunnel. After temporary storage, it can be treated by **settling** and **disinfection** before being discharged into a **receiving body of water**, or it can be treated in a nearby **wastewater treatment plant** at a rate that will not overload the facility. Another method for controlling combined sewage involves the use of **swirl concentrators**. They direct sewage through cylindrically shaped devices, creates a **vortex** or **whirlpool effect**. The vortex helps concentrate impurities in a far smaller volume of water for treatment.

New wastewater collection **facilities** are designed as separate systems, carrying either domestic sewage or storm sewage but not both. Storm sewers usually carry surface runoff to a point of disposal in a stream or river. Small **detention basins** may be built as part of the system, storing storm water temporarily and reducing the **magnitude** of the **peak flow-rate**. **Sanitary sewers**, on the other hand, **carry** domestic wastewater to a **sewage treatment plant**. **Pretreated industrial wastewater** may be directed into municipal **sanitary sewerage systems**, but storm water is excluded.

Storm sewers are usually built with sections of reinforced concrete pipe. **Corrugated** metal pipes may be used in some cases. Storm water **inlets** or **catch basins** are located at suitable intervals. The pipelines are usually located to allow downhill gravity flow to a nearby stream or to a detention basin. Storm water pumping stations are avoided, if possible, because of the very large pump capacities that would be needed to handle the **intermittent** flows.

A sanitary sewerage system includes **laterals**, **submains**, and **interceptors**. Except for individual house connections, laterals are the smallest **sewers** in the network. They usually are not less than 200 mm (8 inches) in diameter and carry sewage by gravity into larger submains or **collector sewers**. The collector sewers **tie into** a main interceptor, or **trunk line**, which carries the sewage to a treatment plant.

Interceptors are usually built with **precast sections** of reinforced concrete pipe, up to 5 metres (15 feet) in diameter. Other materials used for sanitary sewers include **vitrified clay**, **asbestos cement**, plastic, steel, or **ductile iron**. The use of plastic for laterals is increasing because of its lightness and ease of installation. Iron and steel pipes are used for **force mains** or in pumping stations. Force mains are pipelines that carry sewage under pressure when it must be pumped.

Exercise 8. Translate the following words and word combinations into Russian.

Sewerage system; wastewater collection system; appurtenances; treatment; disposal; domestic sewage; industrial sewage; storm sewage; sanitary sewage; combined sewers; sewerage facilities; basin; combined sewer overflow; disinfection; flush; swirl concentrators; magnitude; wastewater treatment plant; receiving body of water; whirlpool effect; detention basins; pretreated industrial wastewater; sanitary sewerage systems; storm water; intermittent; laterals; submains; interceptors; collector sewers; trunk line.

Exercise 9. Translate the expressions into Russian paying attention to the prepositions.

1. Point **of** treatment and disposal; 2. Convey sewage **from** its points **of** origin; 3. Storm water is runoff **from** precipitation; 4. Sewers consist **of** large-diameter pipes; 5. Flush **of** combined sewage **into** a basin; 6. Combined sewage can be treated **by** settling; 7. Another method **for** controlling sewage; 8. Smaller volume **of** water **for** treatment; 9. **Except for** individual house connections; 10. Interceptors are built **with** precast sections.

Exercise 10. Read the text and complete the following sentences. Use the words from the box.

reinforced concrete; house connections; downhill gravity flow; sanitary sewerage; storm sewers; metal pipes; swirl concentrators; industrial sewage; sewerage facilities.

1. ____ is used water from manufacturing or chemical processes.
2. Combined sewers are very common in older cities but are no longer designed and built as part of new ____.
3. Another method for controlling combined sewage involves the use of ____.
4. ____ usually carry surface runoff to a point of disposal in a stream or river.
5. Storm sewers are usually built with sections of ____ pipe.
6. The pipelines are usually located to allow ____ to a nearby stream or to a detention basin.

7. A ____ system includes laterals, submains, and interceptors.
8. Corrugated ____ may be used in some cases.
9. Except for individual ____, laterals are the smallest sewers in the network.

Exercise 11. Translate the following words and word combinations into English using the text.

Насосные станции; три типа сточных вод; дома и квартиры; производственные или химические процессы; осадки; бытовые сточные воды; ливневые сточные воды; периоды дождливой погоды; подземный туннель; направлять сточные воды; сбор сточных вод; бытовые сточные воды; подходящий интервал; водохранилище с регулируемым выпуском; сеть; система бытовой канализации; железобетонная труба; 200 мм в диаметре; пластик; сталь; асбестоцемент; лёгкость.

Exercise 12. Answer the following questions.

1. What is the purpose of the sewerage system? 2. What types of wastewater or sewage are there today? 3. What do combined sewers typically consist of? 4. How has the combined sewer overflow problem been reduced in some large cities? 5. What does another method for controlling combined sewage involve? 6. How are new wastewater collection facilities designed? 7. What is the purpose of small detention basins? 8. What are storm sewers usually built with? 9. Why are storm water pumping stations avoided? 10. What does a sanitary sewerage system include? 11. Why is the use of plastic for laterals increasing?

UNIT 22

Spillways

The Participle I (Причастие настоящего времени)

Причастие настоящего времени (The Participle I) образуется путем прибавления окончания **-ing** к глаголу в форме инфинитива без частицы **to** (см. правила орфографии в уроке 10):

The Forms of the Participles (Формы причастий)

	Active	Passive
Participle I Indefinite	reading	being read

The Functions of the Participle (Функции причастий)

В предложении причастие настоящего времени (The Participle I) может быть:

1) *определением*. В этой функции *Participle I Indefinite Active* соответствует русскому действительному причастию настоящего времени, оканчивающемуся на *-щий*, или действительному причастию прошедшего времени, оканчивающемуся на *-вший*. В данной функции причастие может находиться как *слева* от определяемого слова, так и *справа* от него:

A barking dog doesn't bite. – Лающая собака не кусается.

The woman sitting by the window stood up and left. – Женщина, сидевшая у окна, встала и ушла.

2) обстоятельством *времени* с союзами **when** – *когда* и **while** – *в то время как, пока*, которые на русский язык обычно не переводятся. В функции обстоятельства времени *Participle I Indefinite Active* на русский язык переводится деепричастием на *-я* и *-а*.

When taking the decision I made a mistake. – Принимая это решение, я сделал ошибку.

While unloading the ship, we found a few broken cases. – Разгружая судно, мы обнаружили несколько поломанных ящиков.

3) обстоятельством *причины*. В данной функции *Participle I Indefinite Active* соответствует русскому деепричастию на *-я* и *-а*:

I turned back, not knowing where to go. – Я повернул назад, не зная, куда идти.

4) *Participle I Indefinite Passive* в качестве *определения* в предложении соответствует русскому страдательному причастию, несовершенного вида, настоящего времени на *-мый*, и действительному возвратному причастию несовершенного вида, настоящего времени на *-щийся*. Данная форма причастия находится только *справа* от определяемого слова:

The stones being thrown by the boys are falling into the water. – Камни, бросаемые мальчиками, падают в воду.

The house being built in our street will soon be ready. – Дом, строящийся на нашей улице, скоро будет готов.

5) в функции *обстоятельства* *Participle I Indefinite Passive* соответствует в русском языке страдательному деепричастию: **being asked** – *будучи спрошенным (спрашиваемым)*. Обороты с участием *Participle I Indefinite Passive* соответствуют придаточным предложениям *причины* и *времени* с глаголом-сказуемым в страдательном залоге.

a) *Being asked* (= *When he was asked...*) for help, he gave us explicit instructions. – Будучи спрошенным (Когда его попросили) о помощи, он дал нам четкие инструкции.

b) *Being packed* in strong cases (= *As the goods were packed in strong cases...*), the goods arrived in good condition. – Будучи упакованными в крепкие ящики (= Так как товары были упакованы в крепкие ящики...), товары прибыли в хорошем состоянии;

б) обстоятельством образа действия или сопутствующих обстоятельств (действий). В данной функции *Participle I Indefinite Active* соответствует русскому деепричастию на -я и -а:

a) He sat in the armchair *reading* a newspaper. – Он сидел в кресле, читая газету.

The Forms of the Perfect Participles (Формы перфектных причастий)

	Active	Passive
Perfect Participle I	having written	having been written

The Functions of the Perfect Participles (Функции перфектных причастий)

В предложении перфектное причастие (The Perfect Participle I) может быть:

1) обстоятельством *причины* в форме *Perfect Participle I Active*. Такие предложения на русский язык переводятся придаточным обстоятельным предложением:

Having lost the key (= *As they had lost the key...*), they couldn't get in. – Потеряв ключ (= Так как они потеряли ключ...), они не могли войти в комнату.

Форма *Perfect Participle I Passive* переводится придаточным предложением со словами *так как*:

Having been forbidden to go out, I stayed at home. – Я остался дома, так как мне *запретили* выходить;

2) обстоятельством *времени* в форме *Perfect Participle I Active*, когда хотят подчеркнуть, что действие, выраженное причастием, предшествовало действию сказуемого предложения. На русский язык такая форма переводится деепричастием совершенного вида с окончаниями -в и -я:

Having finished school he went to Oxford. – *Окончив* школу, он поступил в Оксфорд.

Форма *Perfect Participle I Passive* переводится придаточным предложением со словами *после того как*:

Having been given the toy (= *After (When) the child was given the toy...*), the child stopped crying. – *После того как (Когда) ребенку дали игрушку*, он перестал плакать.

Exercise 1. Translate the following sentences paying attention to the Participle I.

1. The girl standing at the window is my sister. 2. The question being discussed now is very important. 3. He sat in the arm-chair thinking about new tasks. 4. She came up to us breathing heavily. 5. The lecture being delivered by a famous scientist is listened to with great attention. 6. The singing girl is about fourteen. 7. Being built of prefabricated parts, it will soon be ready. 8. The large building being built in our street is a new school. 9. Having finished the experiment, the students left the laboratory. 10. Being busy, he postponed his trip. 11. Having been written long ago, the manuscript was impossible to read. 12. The film being shown now is very interesting. 13. Driving a car a man tries to keep steady speed. 14. Having stated the laws of gravity, Newton was able to explain the structure of the Universe. 15. Being more efficient than human beings, computers are used extensively. 16. Having graduated from Cambridge, Newton worked there as a tutor. 17. Having been published in 1687, Newton's laws of motion are still the basis for research.

Exercise 2. Put the infinitives given in brackets into the Active or Passive forms of the Participle I.

1. (Impress) by the film, people kept silent. 2. (Lose) the book, the student couldn't remember the topic. 3. He spent the whole day (read) a new book. 4. The question (to discuss) now is very important. 5. He watched Mike (go) out of the door and (cross) the street. 6. (travel) around America for a month, she returned to England. 7. (Pack) in the beautiful box the flowers looked very lovely. 8. (Descent) the mountains, our students heard a man calling for help. 9. (Reject) by everybody Richard became a monk.

Exercise 3. Make the right choice.

1. (*Having written / writing*) the dictation, Elisabeth made many mistakes. 2. (*Having written / writing*) the letter, Sue posted it. 3. (*Building / having built*) a new house, workers used all modern methods of construction. 4. (*Building / having built*) the house, the Browns arranged a great party for the relatives and friends. 5. (*While living / having lived*) in St. Petersburg for

ten years I visited all its museums. 6. (*While living / having lived*) in St. Petersburg for ten years, I moved to Minsk. 7. (*When solving / having solved*) new problems, scientists do a lot of research.

The Participle II **(Причастие прошедшего времени)**

По способу образования причастия прошедшего времени (The Participle II) глаголы делятся на две группы: *правильные* и *неправильные*. Правильные глаголы образуют Participle II путем прибавления к форме инфинитива окончания **-ed**, например: to open + **ed** = **opened** (см. правила орфографии в уроке 13). У неправильных глаголов третья форма является формой причастия прошедшего времени: to begin – began – **begun**.

The Functions of the Participle II **(Функции причастия прошедшего времени)**

Причастие прошедшего времени (The Participle II) соответствует русскому страдательному причастию настоящего времени оканчивающемуся на **-мый**, и страдательному причастию прошедшего времени, оканчивающемуся на **-нный**, **-тый**, а также действительным причастиям со страдательным значением, оканчивающимся на **-щийся**, **-вший(ся)**.

I buy foods *produced* in Russia. – Я покупаю продукты, *производимые / произведенные* в Беларуси.

I liked books *published* by Meridian-Press. – Мне нравились книги, *издающиеся / издававшиеся* Meridian-Press;

В предложении причастие прошедшего времени может быть:

1) *определением*. В этой функции причастие прошедшего времени (Participle II) употребляется либо перед определяемым словом (*слева от него*), либо после (*справа*).

The kids found the *stolen* diamonds in a rubbish bin. – Дети нашли *украденные* бриллианты в мусорном ведре.

The movie *watched* by Kate yesterday was interesting. – Фильм, *просмотренный* Кейт вчера, был интересным;

2) обстоятельством *причины*. В этой функции причастие прошедшего времени (The Participle II) соответствует в русском языке причастиям на **-мый**, **-щийся**, **-нный**, **-тый**, **-вший(ся)** или придаточным предложениям *причины*:

Squeezed by the ice (= As the steamer was squeezed by the ice) the steamer could not continue her way. – Сжатый льдом (= Так как пароход был сжат льдом), пароход не мог продолжать свой путь;

The torn off by the strong wind, the leaves covered the ground. – Сорванные сильным ветром листья устилали землю.

3) обстоятельство *времени*, где перед причастием прошедшего времени (The Participle II) употребляется союз **when**:

When given the book, read the article about animals. – Когда вам дадут книгу, прочтите статью о животных;

4) обстоятельством *условия*, где перед причастием прошедшего времени (The Participle II) употребляется союз **if**:

If asked, he will tell them everything. – Если его спросят, он им все расскажет.

5) обстоятельством *уступки*, где перед причастием прошедшего времени (The Participle II) употребляется союз **though**:

Though expected on Saturday, he arrived on Monday. – Хотя его ожидали в субботу, он приехал в понедельник;

6) обстоятельством *сравнения*, где перед причастием прошедшего времени (The Participle II) употребляется союз **as if (as though)**:

He suddenly stopped as if (as though) struck by the news. – Он вдруг остановился, как будто пораженный новостью

Exercise 4. Translate the following sentences paying attention to the Participle II.

1. When told how much the trip would cost, they decided to stay at home. 2. For a moment the group stood as if turned to stone. 3. Though surprised by Tom's arrival, Miss Marple didn't show it. 4. If left to myself, I should use this chance by all means. 5. If distilled, water will become quite tasteless. 6. Though highly respected, she felt a stranger among all these people. 7. The main subject studied at our university is economics. 8. If given a chance, she will become a brilliant actress. 9. Though designed for beginners, this textbook may be used for intermediate students. 10. The letter was illegible as if written in a hurry. 11. The method followed by our scientists was not simple. 12. Books read in childhood seem like old friends. 13. When asked, he always helped me.

Exercise 5. State the sentences in which the ending -ed is used to form the Past Indefinite or the Participle II. Translate the sentences.

1. The first television set produced quite a sensation in 1939. The first television set produced in 1939 was a tiny nine-by-twelve inch box. 2. Newton's great work published in 1687 is called "Principia". Newton published his great work "Principia" in 1687. 3. The Russian Chemical So-

ciety organized more than a century ago is named after Mendeleev. The Russian Chemical Society organized an international conference devoted to the latest achievements in organic chemistry. 4. The energy possessed by the body due to its position is called the potential energy. The new material possessed good properties. 5. The car model developed a speed of 50 miles an hour. The car model developed by our student design bureau will be shown on TV.

Exercise 6. Put the infinitives in brackets in the Participle II. Translate the sentences into Russian.

1. The letter (write) by him was very long. 2. We are interested in the goods (produce) by this factory. 3. She didn't understand the word (say) by him. 4. He didn't see the things (keep) in her box. 5. I don't like the video game (buy) yesterday. 6. This is the house (build) many years ago. 7. The question (put) to the professor was important. 8. When (offer) to work abroad, he refused. 9. The article on agriculture (publish) in this magazine was written by Smith. 10. You can get the book (recommend) by our teacher in the library. 11. When (use) for building purposes, concrete is very important. 12. When (complete) the new building will accommodate 3 000 students. 13. The explanation (give) was not complete.

Exercise 7. Read and memorize the following words and word combinations.

air vent ['eəvent] – воздухоподводящее отверстие
 arch dam [ɑ:ʃ dæm] – арочная плотина
 bed [bed] – основание
 bent portion [bent 'pɔ:ʃən] – изогнутая часть
 bottom outlet ['bɒtəm 'aʊtlet] – глубинный водосброс
 buttress dam ['bʌtrɪs dæm] – контрфорсная плотина
 channel downstream ['ʃænəl, daʊn'stri:m] – русло нижнего бьефа
 chute spillway [ʃu:t 'spɪlweɪ] – лотковый водосброс
 conduit ['kɒnd(j)uɪt] – водовод
 crest [krest] – гребень (*плотины*)
 dam body [dæm 'bɒdɪ] – тело плотины
 discharge [dɪs'tʃɑ:dʒ] – выпускать; спускать (*воду*)
 discharge capacity [dɪs'tʃɑ:dʒ kə'pæsəti] – пропускная способность для сброса (*водотока, водопроводящего сооружения*)
 discharge needs [dɪs'tʃɑ:dʒ ni:dz] – необходимые объемы сброса воды
 disposes of [dɪs'pəʊz əv] – избавляться от, удалять
 downstream surface [,daʊn'stri:m 'sɜ:fɪs] – низовой откос (*плотины*)
 earthen dam ['ɜ:θən dæm] – земляная плотина
 excavation [,ekska'veɪʃən] – выемка, разработка грунта/породы

full capacity [ful kə'pæsəti] – полный объём
 gate [geɪt] – затвор (*гидротехнический*)
 gravity dam ['grævɪtɪ dæm] – гравитационная плотина (*с обеспечением устойчивости действием собственного веса*)
 head [hed] – напор
 labyrinth spillway ['læbərɪnθ 'spɪlweɪ] – лабиринтный водосброс
 nappe ['læʊə nəp] – слой воды; струя воды, стекающая с водослива
 ogee spillway ['əʊdʒi: 'spɪlweɪ] – водослив практического профиля
 ogee-shaped ['əʊdʒi:-ʃeɪpt] – огивальной формы
 ogee-shaped crest ['əʊdʒi:-ʃeɪpt krest] – огивальный (волнообразный) гребень
 overflow spillway [ˌəʊvə'fləʊ 'spɪlweɪ] – сбросный водослив
 overtopping [əʊvə'tɒpɪŋ] – перелив (*через гребень глухой плотины*)
 pool level [pu:l 'levəl] – уровень водоёма (*соответствующий естественному объёму*)
 reservoir pool ['rezəvwa: pu:l] – водохранилище
 rock fill dam ['rɒkfɪl dæm] – каменнонабросная плотина
 saddle ['sædl] – седловина
 shaft spillway [ʃɑ:ft 'spɪlweɪ] – шахтный водосброс
 side channel spillway [saɪd 'ʃænəl 'spɪlweɪ] – водосброс с боковым отводом воды
 siphon spillway ['saɪfən 'spɪlweɪ] – сифонный водосброс
 siphonic action [sɪ'fɒnɪk 'ækʃən] – сифонное действие
 spillway ['spɪlweɪ] – водосброс (*на плотине*), водосливное сооружение
 steeply sloped ['sti:pli sləʊpt] – с крутым уклоном
 straight drop spillway [streɪt drɒp 'spɪlweɪ] – водослив с прямоугольным порогом
 supercritical [ˌsu:pə'krɪtɪkəl] – сверхкритический
 upstream [ʌp'stri:m] – верхний бьеф, верхнее течение
 upstream side [ʌp'stri:m saɪd] – напорная сторона (*плотины*)
 valve [vælv] – затвор (*гидротехнический*)
 version ['vɜ:ʃən] – вариант конструкции
 weir [weɪ] – водослив; водосливная плотина
 weir wall [weɪ wɔ:l] – стена водосливной плотины
 weir's downstream face [weɪzˌdaʊn'stri:m feɪs] – низовая сторона водосливной плотины
 zigzag ['zɪgzæg] – зигзагообразный
 energy dissipator ['enədʒɪ 'dɪsɪpeɪtə] – гаситель энергии (*потока*)

Exercise 8. Read and translate the following text.

A **spillway** is a vital hydraulic structure built to release excess water from a dam or reservoir once it reaches its **full capacity**. It prevents **overtopping** and ensures the dam's safety by allowing controlled water flow during floods. Spillways are generally located near the top of the **reservoir pool**, though some dams use **bottom outlets** with **gates** or **valves** instead of **overflow spillways**. Different types of spillways such as **straight drop**, **ogee**, **shaft**, **chute**, **side channel**, **siphon** and **labyrinth spillways** – are designed according to the dam type, site conditions and **discharge needs**. Each has its own advantages and disadvantages, influencing its selection and performance.

A *straight drop spillway* is made up of a low-height **weir wall** with a **downstream surface** that is roughly or perfectly vertical. When the reservoir's water level rises above the normal pool level, the excess water falls freely from the crest of the weir, and thus, the name is given as straight drop spillway or free overfall spillway.

The name *ogee spillway* refers to the shape of the **weir's downstream face**. It is a better **version** of a straight drop spillway. In this case, the downstream face of the weir is built to match the shape of the lower **nappe** of a freely falling water jet, which is **ogee-shaped**. Excess water is freely **discharged** through the ogee spillway along its **ogee-shaped crest**, so it is also known as an overflow spillway. Ogee spillways are most commonly used in **gravity dams**, **arch dams**, **buttress dams**, etc. It is usually located within the **dam body** in gravity dams.

Shaft spillways are spillways that are made up of a vertical shaft followed by a horizontal **conduit**. The excess water enters the vertical shaft, then the horizontal conduit, and finally, the **channel downstream**. The shaft can be either artificial or natural. **Excavation** for the natural shaft is only possible when the hard rocky layer on the **upstream side** is present. The horizontal conduit either runs through the dam body or dam foundation.

A *chute spillway* is a type of spillway that **disposes of** excess water from **upstream** through a **steeply sloped** open channel to the downstream. It is typically built at one end of the dam or separately away from the dam in a natural **saddle** on a river bank. Chute spillways are appropriate for gravity dams, **earthen dams**, **rockfill dams**, and other similar structures. The slope of the chute spillway is designed in a way that the flow is always in **super-critical** condition. **Energy dissipators** can be installed on the **bed** of the chute spillway to dissipate the energy from the falling water.

A *side channel spillway* is similar to the chute spillway. The only difference between a side channel spillway and a chute spillway is that the crest

of a side channel spillway is located on one of its sides, whereas the crest of a chute spillway is located between the side walls. In other words, unlike the chute spillway, the water spilling from the crest is turned 90° and flows parallel to the **crest** of the side channel spillway.

A *siphon spillway* is a type of spillway that directs excess water downstream via an inverted U-shaped conduit. It is usually arranged inside the dam or over the dam's crest. **Air vents** are provided at the **bent portion** of the upper passageway in both types of siphon spillways to prevent water from entering when the water level is below the normal **pool level**. When the level rises above the normal pool level, water enters the conduit and is discharged downstream by **siphonic action**.

A *labyrinth spillway* is a type of dam spillway in which the weir wall is built in a **zigzag** manner to increase the effective length of the weir crest in relation to the channel width. This increase in effective length increases the weir's **discharge capacity**, allowing for higher water flow at low **heads** that can be easily conveyed to the downstream.

Exercise 9. Translate the following words and word combinations into Russian.

Spillway; full capacity; prevent overtopping; bottom outlets; valves; overflow spillways; straight drop spillway; ogee spillway; shaft spillway; chute spillway; side channel spillway; siphon spillway; labyrinth spillway; weir wall; downstream surface; weir's downstream face; lower nappe; ogee-shaped crest; gravity dams; arch dams; buttress dam; dam body; conduit; channel downstream; upstream side; saddle; earthen dams; rockfill dams; energy dissipators; pool level; siphonic action; discharge capacity.

Exercise 10. Translate the expressions into Russian paying attention to the prepositions.

1. Release excess water **from** a dam; 2. Spillways are located **near** the top **of** the reservoir pool; 3. Different types **of** spillways; 4. Water level rises **above** the normal pool level; 5. Shape **of** the lower nappe; 6. Water falls **from** the crest of the weir; 7. Water is discharged **through** the ogee spillway; 8. Ogee spillways is located **within** the dam body; 9. A chute spillway is built **at** one end **of** the dam; 10. Water is discharged **by** siphonic action.

Exercise 11. Translate the following words and word combinations into English using the text.

Обеспечивает сохранность плотины; поток воды во время наводнений; преимущества и недостатки; производительность; почти или строго вертикально; выше обычного уровня водоема; водослив с прямоугольным порогом; низовой откос плотины; сбросный водослив;

вертикальная шахта; либо искусственный, либо естественный; естественная седловина; гравитационная плотина; рассеивать энергию падающей воды; гребень; водосброс с боковым отводом воды; верхний проход; поворачиваться на 90°; ниже обычного уровня водоема; тип водосброса плотины; ширина канала; эффективная длина.

Exercise 12. Translate the words and word combination in brackets into English using the text.

1. (Водослив практического профиля) are most commonly used in gravity dams, arch dams, (контрфорсные плотины), etc.

2. A (водосброс) is a vital hydraulic structure built (сбросить избыточную воду) from a dam or reservoir once it reaches (свой полный объём).

3. (Разработка грунта) for the natural shaft is only possible when the (твердый каменистый слой) on the upstream side is present.

4. The slope of the (лотковый водосброс) is designed in a way that the flow is always in (сверхкритическое состояние).

5. A (сифонный водосброс) is a type of spillway that (направляет избыточную воду) downstream via an (перевернутый U-образный трубопровод).

Exercise 13. Match adjectives with nouns using the text. Translate the collocations.

- | | |
|------------------|--------------|
| 1. hydraulic | a) manner |
| 2. better | b) layer |
| 3. vertical | c) conduit |
| 4. horizontal | d) length |
| 5. supercritical | e) version |
| 6. zigzag | f) structure |
| 7. effective | g) shaft |
| 8. rocky | h) condition |

Exercise 14. Answer the following questions.

1. What is a spillway? 2. Where are the spillways located? 3. What types of spillways are there? 4. What happens when the reservoir's water level rises above the normal pool level? 5. Where are the ogee spillways most commonly used? 6. How do the shaft spillways function? 7. What is the difference between a side channel spillway and a chute spillway? 8. What is the purpose of a siphon spillway? 9. Why are air vents provided at the bent portion of a siphon spillway? 10. Why is a labyrinth spillway usually built in a zigzag manner?

ТАБЛИЦА НЕПРАВИЛЬНЫХ ГЛАГОЛОВ С ПЕРЕВОДОМ

	Infinitive	Past Simple	Past Participle
1	be [bi:] быть	was [wɒz], were [wɜ:]	been [bi:n]
2	beat [bi:t] бить	beat [bi:t]	beaten ['bi:tən]
3	become [bi'kʌm] становиться	became [bi'keɪm]	become [bi'kʌm]
4	begin [bi'gɪn] начинать	began [bi'gæn]	begun [bi'gʌn]
5	bleed [bli:d] кровоточить	bled [bled]	bled [bled]
6	blow [bləʊ] дуть	blew [blu:]	blown [bləʊn]
7	break [breɪk] ломать	broke [brəʊk]	broken ['brəʊk(ə)n]
8	bring [brɪŋ] приносить	brought [brɔ:t]	brought [brɔ:t]
9	build [bɪld] строить	built [bɪlt]	built [bɪlt]
10	burn [bɜ:n] гореть	burnt [bɜ:n]	burnt [bɜ:n]
11	burst [bɜ:st] разразиться	burst [bɜ:st]	burst [bɜ:st]
12	buy [baɪ] покупать	bought [bɔ:t]	bought [bɔ:t]
13	catch [kætʃ] ловить; успеть	caught [kɔ:t]	caught [kɔ:t]
14	choose [tʃu:z] выбирать	chose [tʃəʊz]	chosen [tʃəʊz(ə)n]
15	come [kʌm] приходить	came [keɪm]	come [kʌm]
16	cost [kɒst] стоить	cost [kɒst]	cost [kɒst]
17	creep [kri:p] ползать	crept [krept]	crept [krept]
18	cut [kʌt] резать	cut [kʌt]	cut [kʌt]
19	do [du:] делать	did [dɪd]	done [dʌn]
20	draw [drɔ:] рисовать; тащить	drew [dru:]	drawn [drɔ:n]
21	dream [dri:m] мечтать; дремать	dreamt [dremt]	dreamt [dremt]
22	drink [drɪŋk] пить	drank [dræŋk]	drunk [draŋk]
23	drive [draɪv] водить	drove [drəʊv]	driven ['drɪv(ə)n]
24	eat [i:t] есть	ate [et]	eaten [i:t(ə)n]
25	fall [fɔ:] падать	fell [fel]	fallen [fɔ:lən]
26	feed [fi:d] кормить	fed [fed]	fed [fed]
27	feel [fi:l] чувствовать	felt [felt]	felt [felt]
28	fight [faɪt] бороться	fought [fɔ:t]	fought [fɔ:t]
29	find [faɪnd] находить	found [faʊnd]	found [faʊnd]
30	fit [fɪt] подходить по разме- ру	fit [fɪt]	fit [fɪt]
31	fly [flaɪ] летать	flew [flu:]	flown [fləʊn]
32	forget [fə'get] забывать	forgot [fə'gɒt]	forgotten [fə'gɒt(ə)n]
33	forgive [fə'gɪv] прощать	forgave [fə'geɪv]	forgiven [fə'gɪv(ə)n]
34	freeze [fri:z] заморозить	froze [frəʊz]	frozen ['frəʊz(ə)n]
35	get [get] получать	got [gɒt]	got [gɒt]
36	give [gɪv] давать	gave [geɪv]	given [gɪv(ə)n]
37	go [gəʊ] идти	went [went]	gone [gɒn]
38	grow [grəʊ] расти	grew [gru:]	grown [grəʊn]
39	hang [hæŋ] вешать	hung [hʌŋ]	hung [hʌŋ]
40	have [hæv] иметь	had [hæd]	had [hæd]
41	hear [hɪə] слышать	heard [hɜ:d]	heard [hɜ:d]
42	hide [haɪd] прятать	hid [hɪd]	hidden ['hɪd(ə)n]
43	hit [hɪt] попадать в цель	hit [hɪt]	hit [hɪt]
44	hold [həʊld] держать	held [held]	held [held]
45	hurt [hɜ:t] ушибить	hurt [hɜ:t]	hurt [hɜ:t]

46	keep [ki:p] содержать	kept [kept]	kept [kept]
47	kneel [ni:l] становиться на колени	knelt [nelt]	knelt [nelt]
48	know [nəu] знать	knew [nju:]	known [nəun]
49	lay [lei] класть	laid [leid]	laid [leid]
50	lead [li:d] вести	led [led]	led [led]
51	lean [li:n] наклоняться	leant [lent]	leant [lent]
52	learn [lɜ:n] учить	learnt [lɜ:nt]	learnt [lɜ:nt]
53	leave [li:v] оставлять	left [left]	left [left]
54	lend [lend] давать взаймы	lent [lent]	lent [lent]
55	let [let] позволять	let [let]	let [let]
56	lie [lai] лежать	lay [lei]	lain [leim]
57	light [lait] освещать	lit [lit]	lit [lit]
58	lose [lu:z] терять	lost [lost]	lost [lost]
59	make [meik] производить	made [meid]	made [meid]
60	mean [mi:n] значить	meant [ment]	meant [ment]
61	meet [mi:t] встречать	met [met]	met [met]
62	mistake [mi'steik] ошибаться	mistook [mi'stuk]	mistaken [mi'steik(ə)n]
63	pay [pei] платить	paid [peid]	paid [peid]
64	prove [pru:v] доказывать	proved [pru:vd]	proven [pru:vn]
65	put [put] положить	put [put]	put [put]
66	quit [kwit] прекращать (<i>что-либо делать</i>); оставлять	quit [kwit]	quit [kwit]
67	read [ri:d] читать	read [red]	read [red]
68	ride [raid] ездить верхом	rode [rəud]	ridden ['rid(ə)n]
69	ring [rɪŋ] звенеть	rang [ræŋ]	rung [rʌŋ]
70	rise [raiz] подниматься	rose [rəuz]	risen ['riz(ə)n]
71	run [rʌŋ] бежать	ran [ræn]	run [rʌŋ]
72	say [sei] говорить	said [sed]	said [sed]
73	see [si:] видеть	saw [sɔ:]	seen [si:n]
74	seek [si:k] искать	sought [sɔ:t]	sought [sɔ:t]
75	sell [sel] продавать	sold [səuld]	sold [səuld]
76	send [send] посылать	sent [sent]	sent [sent]
77	set [set] ставить	set [set]	set [set]
78	sew [səu] шить	sewed [səud]	sewn [səun]
79	shake [ʃeɪk] встряхивать	shook [ʃuk]	shaken [ʃeɪk(ə)n]
80	show [ʃəu] показывать	showed [ʃəud]	shown [ʃəun]
81	shrink [ʃrɪŋk] уменьшать	shrank [ʃræŋk]	shrunk [ʃrʌŋk]
82	shut [ʃʌt] закрывать	shut [ʃʌt]	shut [ʃʌt]
83	sing [sɪŋ] петь	sang [sæŋ]	sung [sʌŋ]
84	sink [sɪŋk] тонуть	sank [sæŋk]	sunk [sʌŋk]
85	sit [sit] сидеть	sat [sæt]	sat [sæt]
86	sleep [sli:p] спать	slept [slept]	slept [slept]
87	slide [slaid] скользить	slid [slid]	slid [slid]
88	sow [səu] сеять	sowed [səud]	sown [səun]
89	speak [spi:k] говорить	spoke [spəuk]	spoken ['spəuk(ə)n]
90	spell [spel] произносить по буквам	spelt [spelt]	spelt [spelt]
91	spend [spend] тратить	spent [spent]	spent [spent]
92	spill [spɪl] проливать	spilt [spɪlt]	spilt [spɪlt]
93	spoil [spɔɪl] портить	spoilt [spɔɪlt]	spoilt [spɔɪlt]
94	spread [spred] расстилать	spread [spred]	spread [spred]

95	spring [sprɪŋ] прыгать	sprang [spræŋ]	sprung [sprʌŋ]
96	stand [stænd] стоять	stood [stu:d]	stood [stu:d]
97	steal [sti:l] красть	stole [stəʊl]	stolen ['stəʊləŋ]
98	stick [stɪk] приклеивать; втыкать	stuck [stʌk]	stuck [stʌk]
99	sting [stɪŋ] жалить	stung [stʌŋ]	stung [stʌŋ]
100	sweep [swi:p] выметать	swept [swept]	swept [swept]
101	swell [swel] надуваться	swelled [sweld]	swollen ['swəʊləŋ]
102	swim [swɪm] плавать	swam [swæm]	swum [swʌm]
103	swing [swɪŋ] качать	swung [swʌŋ]	swung [swʌŋ]
104	take [teɪk] брать	took [tuk]	taken ['teɪk(ə)n]
105	teach [ti:tʃ] учить	taught [tɔ:t]	taught [tɔ:t]
106	tear [teə] рвать	tore [tɔ:]	torn [tɔ:n]
107	tell [tel] рассказывать	told [təʊld]	told [təʊld]
108	think [θɪŋk] думать	thought [θɔ:t]	thought [θɔ:t]
109	throw [θrəʊ] бросать	threw [θru:]	thrown [θrəʊn]
110	understand [ˌʌndə'stænd] понимать	understood [ˌʌndə'stʊd]	understood [ˌʌndə'stʊd]
111	wake [weɪk] просыпаться	woke [wəʊk]	woken ['wəʊk(ə)n]
112	wear [weə] носить	wore [wɔ:]	worn [wɔ:n]
113	weave [wi:v] ткать	wove [wəʊv] weaved [wi:vd]	woven ['wəʊv(ə)n] weaved [wi:vd]
114	weep [wi:p] плакать	wept [wept]	wept [wept]
115	wet [wet] смачивать, увлаж- нять	wet [wet]	wet [wet]
116	win [wɪn] выигрывать	won [wʌn]	won [wʌn]
117	wind [waɪnd] извиваться	wound [waʊnd]	wound [waʊnd]
118	withdraw [wɪð'drɔ:] взять назад; отозвать	withdrew [wɪð'dru:]	withdrawn [wɪð'drɔ:n]
119	wring [rɪŋ] скрутить; сжать	wrung [rʌŋ]	wrung [rʌŋ]
120	write [raɪt] писать	wrote [rəʊt]	written ['rɪt(ə)n]

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