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ТРАДИЦИОННЫЕ И СОВРЕМЕННЫЕ СТРОИТЕЛЬНЫЕ МАТЕРИАЛЫ

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В пособии представлены учебные материалы, используемые в преподавании английского языка студентам бакалавриата и специалитета строительных и технических вузов. Пособие состоит из 17 уроков-тем и включает упражнения на проверку прочитанного, закрепление лексики и формирование навыков письменной коммуникации и иноязычного общения по предложенным темам, а также содержит грамматический справочный материал, тексты для внеаудиторного чтения и тематический глоссарий.

Предназначено для студентов 1 курса, обучающихся по направлениям 08.03.01 «Строительство», 22.03.01 «Материаловедение и технологии материалов», а также по специальности 08.05.01 «Строительство уникальных зданий и сооружений».

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ВВЕДЕНИЕ

Учебное пособие по английскому языку «Традиционные и современные строительные материалы» («Traditional and Modern Building Materials») создано для студентов первого курса строительных и технических вузов, обучающихся по направлениям «Строительство», «Материаловедение и технологии материалов», «Строительство уникальных зданий и сооружений».

Цель пособия состоит в комплексном развитии коммуникативной, когнитивной, информационной, социокультурной, профессиональной и общекультурной компетенций студентов, изучении строительной терминологии, развитии умений чтения и перевода оригинальной литературы по данной специальности, а также совершенствовании навыков устной речи и письма. Задания пособия нацелены на подготовку студентов к самостоятельной работе с текстом, обучение устным формам общения на материале предложенных текстов, развитие коммуникативных способностей студентов.

Пособие состоит из 17 уроков-тем, предназначенных для усвоения на аудиторных занятиях под руководством преподавателя.

Грамматический материал сопровождается языковыми и условно-речевыми упражнениями, направленными на усвоение соответствующих грамматических правил. Поурочный словарь-минимум поможет накоплению и расширению терминологического и общеязыкового словаря студентов.

Каждый урок включает:

- 1) фонетические упражнения для закрепления произносительных навыков;
- 2) упражнения, направленные на введение и закрепление лексического материала;
- 3) упражнения для усвоения грамматического материала;
- 4) учебные тексты, снабженные иллюстрациями, которые служат основой для мотивированного высказывания;
- 5) упражнения, направленные на активизацию языкового и речевого материала;
- 6) задания коммуникативной направленности, позволяющие студентам участвовать в иноязычном общении.

Пособие содержит дополнительный текстовый материал, который направлен на стимулирование устного и письменного связного высказывания и может быть использован для самостоятельного обучения различным видам чтения – ознакомительного, обучающего, просмотрового, поискового.

Обширный тематический глоссарий основных строительных терминологических понятий на английском языке служит расширению кругозора и учебно-познавательной деятельности студентов.

Авторы выражают благодарность доценту кафедры иностранных языков и технологии перевода Л. В. Лукиной и доценту кафедры русского языка и межкультурной коммуникации Н. Б. Бугаковой за участие в обсуждении рукописи учебного пособия, ценные рекомендации и критические замечания.

LESSON 1

Phonetics: [aɪ], [aʊ], [o:], [tʃ]

Grammar: To be. There to be

Text: Cement. Цемент

I. Read and translate the following words into Russian:

light, item, find, bind, grind, kind, high, ice, mild, side, site, size, white, wide, private, type, design, wire, fire;

town, house, how, now, down, cloud, round, drown, layout, amount, powder, foundation, ground, without;

always, chalk, small, tall, talk, more, also, short, all, mortar, wall, door, floor, coarse, course, proportion, warm;

mixture, texture, lecture, temperature, manufacture, architecture, structure, nature, moisture, departure.

II. Learn the vocabulary:

cement [si'ment] – цемент, цементировать;

fine powder ['paʊdə] – мелкий порошок;

binding ['baɪndɪŋ] properties ['prɒpətɪz] – вяжущие свойства;

raw [ro:] materials [mə'tɪəriəlz] – сырьевые материалы;

limestone ['laɪmstəʊn] – известняк;

chalk [tʃɔ:k] – мел;

clay [kleɪ] – глина ;

marl [mɑ:l] – мергель, известковая глина;

to produce [prə'dju:s] – производить;

kiln [kɪln] – печь;

mixing ['mɪksɪŋ] – перемешивание;

burning of ['bɜ:nɪŋ] clinker ['kɪŋkə] – обжиг клинкера;

grinding ['graɪndɪŋ] – измельчение;

to rotate [rəʊ'teɪt] – вращаться;

slurry ['slʌrɪ] – жидкий цементный раствор;

to slide down [slaɪd] – скользить вниз;

to take place [teɪk pleɪs] – происходить;

constituent = ingredient [kən'stɪtʃuənt = ɪn'grɪ:diənt] – составная часть;

Rapid Hardening ['ræpɪd 'hɑ:dnɪŋ] Cement – быстротвердеющий цемент;

High Alumina [ə'ljʊ:mɪnə] Cement – цемент с высоким содержанием глинозема;

Hydrographic [ˌhaɪdrə'græfɪk] Cement – гидрографический цемент;

mortar ['mɔ:tə] – строительный раствор;

concrete ['kɒŋkri:t] – бетон;

housing ['haʊzɪŋ] – жилищное строительство;

bridge [brɪdʒ] – мост;

foundation [faʊn'deɪʃn] – фундамент.

III. Study the models and put the verbs into the Past and Future Simple. Make the sentences interrogative and negative.

Model 1:

a) Cement *is* usually of grey colour. Cement *was* white.
Cement *will be* coloured.

b) *There are* kilns for burning clinkers.
There were only two kilns for burning clinkers at the plant.
There will be new kilns there in three months.

Model 2:

a)

<i>Is</i>	cement		of different colours?
<i>Was</i>			
<i>Will</i>		<i>be</i>	

b)

Cement	<i>is not</i>	of different colours.
	<i>was not</i>	
	<i>won't be</i>	

1. Cement is a popular binding material.
2. Its usual colour is grey.
3. There are also white and coloured cements.
4. Cement is made of different materials.
5. The raw materials for cement are limestone, chalk, marl and clay.
6. There are three stages in producing cements.
7. The temperature of the kilns is high.
8. There are various types of cement used in construction.
9. Cement invention is connected with the names of Egor Cheliev from Russia and Joseph Aspdin from England.
10. Cement is the basic ingredient of concrete.

IV. Form nouns adding the suffixes and translate them into Russian.

Model: **stem + suffix = noun (корень + суффикс = существительное)**

to build – builder; строить – строитель

- *er*: do, mix, compute, work, design, produce, plan, receive, restore;
- *or*: construct, elevate, invent, decorate, coordinate, instruct, imitate, create;
- *ion/ation*: combine, construct, prepare, classify, decorate, create, organize;

- **ing**: burn, build, mix, produce, grind, set, house, place, train, plan;
- **ity**: dense, porous, durable, available, total, active, real, popular, regular, secure;
- **ment**: base, develop, achieve, employ, govern, treat, require, reinforce, improve.

V. Point out the suffixes of the following words and the parts of speech they form. Make sentences with the words.

Binder, coloured, producer, mixing, combination, chemical, slowly, lower, layout, architecture, without, foundation.

VI. Read and translate the text.

CEMENT

Cement is a fine powder. It has good binding properties. Cement is usually of grey colour. There are also white and coloured cements. Cement is made of different materials. The raw materials for cement are limestone, chalk, marl and clay.

There are three stages in producing cement: 1) grinding and mixing the raw materials, 2) burning of clinkers, 3) grinding of clinkers. There are special kilns for burning clinkers. The temperature of the kilns is high. The kiln rotates slowly as the slurry slides down to its lower end. During the burning chemical combination takes place between the constituents, and cement clinkers come out of the kiln. A special machine makes powder from them.

Clinker composition depends on the nature of the raw materials, the proportioning, the process (wet or dry), the plant equipment and laboratory control.

There are various types of cement used in construction: Ordinary Portland Cement, Portland Pozzolana Cement, Rapid Hardening Cement, Quick Setting Cement, Low Heat Cement, High Alumina Cement, White Cement, Coloured Cement, Hydrographic Cement, etc. Each type of cement has its own properties, uses, and advantages based on composition of materials used during its manufacture.

Cement is widely used in all types of construction: industrial, housing, agricultural; 1) for binding panels, stones, bricks and 2) for producing mortar and concrete.

Cement is the basic ingredient of concrete, which in turn is the foundation of modern development because concrete puts roofs over the heads of billions, provides a structure for education, healthcare and transport, and defends people from natural disaster.

VII. Fill in the correct prepositions and translate the sentences into Russian.

1. Cement is usually ... grey colour.
2. Cement is made ... different materials.
3. The raw materials ... cement are limestone, chalk, marl and clay.
4. There are special kilns ... burning clinkers.
5. There are three stages ... producing cement.
6. Chemical combination takes place ... the constituents.

7. Cement clinkers come out ... the kiln.
8. A special machine makes powder ... them.
9. Portland cement is widely used ... all types ... construction.
10. Concrete puts roofs ... the heads ... billions and defends people ... disaster.

VIII. Translate the sentences into English.

1. Цемент – вяжущий материал.
2. Сырье для цемента – мел, глина, известняк и мергель.
3. Цемент обычно серый, белый или цветной.
4. В производстве цемента существует три стадии: 1) перемешивание, 2) обжиг клинкера, 3) измельчение клинкера.
5. Обжиг клинкера происходит в печах с высокой температурой.
6. В строительстве используются разные виды цемента.
7. Вяжущие свойства цемента очень важны для строительства.
8. Цемент широко используют в промышленном и сельскохозяйственном строительстве.
9. Цемент – основной ингредиент бетона.
10. Название «портландцемент» связано с островом на юге Великобритании – Портленд, где в 1824 году началось промышленное производство цемента.

IX. Learn the dialogues.

1. A – What do you know about cement?
 B – It's a popular binding material in construction.
 A – What's its usual colour?
 B – As far as I know, grey but there are also white and coloured cements.
2. A – What are the raw materials for cement?
 B – Usually limestone, chalk and marl.
 A – There is one more, clay.
 B – I see, thanks.
3. A – What is the purpose of using cement in construction?
 B – First of all, for binding different materials: bricks, stones, blocks.
 A – And secondly?
 B – Secondly, it gives strength to the structures.
 A – But what was used when there was no cement?
 B – First, clay was used and later gypsum and lime.

X. Answer the following questions.

1. What building material is the text about?
2. What is cement?
3. What properties does cement have?
4. What are the raw materials for cement?
5. What stages are there in producing cement?
6. The temperature of the kilns is high, isn't it?
7. What takes place during the burning?
8. What types of cement do you know?
9. Where is cement used?
10. Why is cement widely used in construction?

XI. Make up a plan of the text.

XII. Sum up what the text about cement.

XIII. Speak about cement as one of the popular binding materials in construction. Make use of the following expressions:

1. I'm going to speak about... – Я собираюсь рассказать о ...
2. Now a few words about... – Теперь несколько слов о ...
3. In conclusion I'd like to say that... – В заключении мне бы хотелось сказать, что ...

LESSON 2

Phonetics: [əʊ], [n], [w], [u:]

Grammar: Simple Active

Text: Gypsum. Гипс

I. Read and translate the following words into Russian:

process, cold, slowly, exposed, both, load, exothermal, known, most, mould, composed, over, stone, component;
know, knit, knife, knock, knew, knot, knowledge, know-how, knick-knack, knob, known, knobble, knock out, knocker, knight;
why, when, while, where, white, wheel, what, which, whisper, whitening, white-wash, whet;
cooling, smooth, school, spoon, soon, bamboo, too, room, balloon, roof, choose, loose.

II. Learn the vocabulary:

gypsum [ˈdʒɪpsəm] – гипс;
interior [ɪnˈtɪəriə] – внутренний;
exterior [ɪkˈstɪ(ə)riə] – внешний;
prominent [ˈprɒmɪnənt] – выдающийся, значимый;
wall [wɔ:l] – стена;
ceiling [ˈsi:lɪŋ] – потолок;
prefabricated [prɪˈfæbrɪkeɪtɪd] – сборный;
gypsum board [bɔ:d] – гипсокартон;
earth's [z:θs] crust [krʌst] – земная кора;
sedimentary [sedɪˈmentəri] – осадочный;
hydrous [ˈhaɪdrəs] calcium [ˈkælsiəm] sulfate [ˈsʌlfet] – гидрат сульфата кальция;
mining [ˈmaɪnɪŋ] – шахтовый метод добычи (полезных ископаемых);
soil [sɔɪl] layers [ˈleɪəz] – слои почвы;
alabaster [ˈæləbɑ:stə] – алебастр;
translucent [trænzˈlu:snt] – матовый, полупрозрачный;
excavation [ˌɛkskəˈveɪʃn] – экскавация, земляные работы;
crushing [ˈkrʌʃɪŋ] – дробление;
calcination [ˌkælsiˈneɪʃən] – обжиг;
cooling [ˈku:lɪŋ] – охлаждение, обдув;
pulverizing [ˈpʌlvəraɪzɪŋ] – измельчение в порошок;
packing [ˈpækɪŋ] – упаковка;
valuable [ˈvælju(ə)b(ə)l] – ценный;
smooth [smu:ð] – гладкий;
aesthetic [i:sˈθetɪk] – эстетичный;
odour [ˈəʊdə] – запах;
acoustic [əˈku:stɪk] properties [ˈprɒpətɪz] – акустические свойства;
attractive [əˈtræktɪv] – привлекательный.

III. Study the model 1 and put the verbs into the Present and Future Simple. Study the model 2 and make the sentences interrogative and negative.

Model 1:

Gypsum has many valuable properties for modern construction.

Gypsum will have many valuable properties for modern construction.

Model 2:

Did gypsum have many valuable properties for modern construction?

Gypsum didn't have many valuable properties for modern construction.

Does gypsum have many valuable properties for modern construction?

Gypsum doesn't have many valuable properties for modern construction.

Will gypsum have many valuable properties for modern construction?

Gypsum won't have many valuable properties for modern construction.

1. Gypsum gains different forms.
2. Gypsum stone has the property to be carved to any sculpture forms.
3. Gypsum stone consists of around 30% of bounded water in natural state.
4. Gypsum has many valuable properties for modern construction.
5. Gypsum delivers smooth surface.
6. Gypsum balances indoor atmosphere.
7. Gypsum has high thermal and acoustic insulation.
8. Gypsum provides good aesthetic and functional features.
9. The simplicity of technology makes gypsum a cheap binding material.
10. Constructors often use gypsum for creating decorative elements of buildings.

IV. Form adjectives adding the suffixes and translate them into Russian.

Model: *stem + suffix = adjective (корень + суффикс = прилагательное)*

help - *helpless*; помощь – беспомощный

- **able/ible:** break, avail, read, construct, move, cure, expand, respond;
- **al:** person, tactic, origin, clinic, form, function, structure, profession, industry;
- **ic:** period, monolith, climate, specify, geometry, economy, cube, metal, atmosphere;
- **ed:** talent, use, produce, burn, mix, stripe, experience, reinforce, prefabricate;
- **less:** weight, breath, fire, sound, hope, home, plan, time, form, motion;
- **ful:** power, beauty, thank, grace, care, colour, thought, use, success.

V. Point out the suffixes of the following words and the parts of speech they form. Make sentences with the words.

Affected, setting, different, connected, desirable, greatly, resistance, addition, crushed, smaller, temperature, practical, functional.

VI. Read and translate the text.

GYPSUM

Gypsum is one of the widely used building materials mainly in interior design of buildings. Gypsum is used as a surface material. Its application is prominent in wall and ceiling construction. It is manufactured as a prefabricated unit, such as gypsum board.

Usually gypsum is a white or grey mineral found in the earth's crust. It is a sedimentary mineral chemically known as hydrous calcium sulfate, which is obtained through mining in lower and upper soil layers. It gains different forms. The gypsum stone, which is also called alabaster, has the property to be carved to any sculpture forms. This stone is translucent in nature. It consists of around 30% of bounded water

in natural state. This water is taken out from it through continuous heating until its white powder form is obtained.

The production of gypsum can be mentioned in 7 following stages: excavation, crushing, grinding, calcination, cooling, pulverizing and packing.

Gypsum has many valuable properties for modern construction: it delivers smooth surface, balances indoor atmosphere. Besides being fire-resistant, it is environmentally friendly. Gypsum has high thermal and acoustic insulation. It also provides good aesthetic and functional features.

Gypsum is a natural product that is commonly available. It is free of odour. Nowadays many of the interior and the exterior construction features are mostly governed by gypsum construction or gypsum products. The advancement of gypsum construction in a continuous process is due to its reduced time and the cost of construction.

The availability of raw materials and simplicity of technology make gypsum a cheap and attractive binding material for builders.

VII. Fill in the correct prepositions and translate the sentences into Russian.

1. Gypsum is one ... the widely used building materials.
2. Its application is prominent ... wall and ceiling construction.
3. This stone is translucent ... nature.
4. It consists ... around 30% ... bounded water ... natural state.
5. Water is taken ... it through continuous heating.
6. Gypsum has many valuable properties ... modern construction.
7. It is free ... odour.
8. The exterior construction features are mostly governed ... gypsum construction or gypsum products.
9. The advancement ... gypsum construction ... a continuous process is due ... the cost ... construction.
10. The availability ... raw materials and simplicity ... technology make gypsum a cheap and attractive binding material ... builders.

VIII. Translate the sentences into English.

1. Гипс - один из самых широко используемых строительных материалов, применяемых в основном в дизайне интерьеров.
2. Гипс используется в качестве поверхностного материала.
3. Гипс – это белый или серый минерал, обнаруженный в земной коре.
4. Это осадочный минерал, добываемый шахтовым методом в верхних и нижних слоях почвы.
5. Гипс может принимать разные формы.
6. В естественном состоянии гипсовый камень примерно на 30% состоит из воды.
7. Гипс обладает высокой тепло- и звукоизоляцией.

8. Гипс - это общедоступный материал естественного происхождения.
9. Гипс не имеет запаха.
10. Доступность сырья и простота технологии делают гипс дешевым и привлекательным вяжущим материалом для строителей.

IX. Put all possible questions to the sentences.

1. Gypsum is one of the widely used building materials mainly in interior design.
2. Gypsum is a natural product that is commonly available.
3. Gypsum has many valuable properties for modern construction.

X. Answer the following questions.

1. What building material is the text about?
2. Gypsum is used as a surface material, isn't it?
3. How is gypsum manufactured?
4. Where is gypsum found?
5. How is gypsum obtained?
6. How is gypsum stone called?
7. What are the stages in producing gypsum?
8. Is gypsum free of odour?
9. Why is gypsum so important in modern construction?
10. Why is gypsum a cheap and attractive binding material for builders?

XI. Sum up what the text said about gypsum.

XII. Match the following phrases with their definitions.

- | | |
|------------------------------------|-----------------------------------|
| 1. It's a well known fact that... | a) само собой разумеется, что ... |
| 2. It is necessary to note that... | b) необходимо отметить, что ... |
| 3. As far as I remember... | c) нет сомнения в том, что ... |
| 4. It goes without saying... | d) общеизвестный факт, что ... |
| 5. There's no doubt that... | e) насколько я помню, ... |

XIII. Speak about the most important characteristics of gypsum using the expressions in exercise XII.

LESSON 3

Phonetics: [a:], [i:], [ʌ], [æ], [ŋ]

Grammar: To have

Text: Brick. Кирпич

I. Read and translate the following words into Russian:

article, particle, fast, past, pass, task, dark, partition, hard, glass, arch, after, mark,

larch, vast, branch, answer, demand, cast, example;
cheap, heat, beam, steel, reason, keep, need, ceiling, receive, field, engineering, appearance, deal, increase, piece, brief, we, meter;
but, cut, number, some, come, done, colour, result, under, touch, double, must, tuff;
where, there, their, rare, spare, square, chair;
strong, along, prolong, mixing, sink, setting, blank, young, facing, according, morning, thing, long, young, wrong, among, song, tongue.

II. Learn the vocabulary:

brick [brɪk] – кирпич;
artificial [ˌɑːtɪˈfɪʃl] – искусственный;
mud [mʌd] – грязь;
reason [ˈriːzn] – причина, основание;
to survive [səˈvaɪv] – выжить, продолжать существовать, сохраняться;
to influence [ˈɪnfluəns] – влиять;
availability [əˌveɪləˈbɪləti] – наличие;
to obtain [əbˈteɪn] – добывать;
to perfect [prəˈfekt] – совершенствовать, улучшать;
to revive [rɪˈvaɪv] – возродить, возобновлять;
to deliver [dɪˈlɪvə] – доставлять;
versatile [ˈvɜːsətaɪl] – многофункциональный;
recyclable [ˌrɪːˈsaɪkləbl] – пригодный для вторичной переработки;
high [haɪ] thermal [ˈθɜːml] mass [mæs] – большая термальная масса;
to change [tʃeɪndʒ] – менять;
forming [ˈfɔːmɪŋ] – формовка;
beneficiation [ˌbenɪfɪʃiˈeɪʃ(ə)n] – обработка;
kind [kaɪnd] – вид, тип;
facing [ˈfeɪsɪŋ] – облицовочный;
common [ˈkɒmən] – обычный;
engineering [ˌendʒɪˈnɪərɪŋ] brick – кирпич повышенной прочности;
hollow [ˈhɒləʊ] – пустотелый;
porous [ˈpɔːrəs] – пористый;
sand-lime [ˈsændˌlaɪm] – силикатный;
reinforced [ˌrɪːnˈfɔːst] – армированный;
refractory [rɪˈfræktəri] – огнеупорный;
to value for [ˈvæljuː] – ценить за;
aesthetic [iːsˈθetɪk] qualities [ˈkwɒlətɪz] – эстетические качества;
weather-resistant [ˈweðəriˌzɪstənt] – устойчивый к атмосферным воздействиям;
weather resistance [ˈweðəriˌzɪstəns] – устойчивость к атмосферным воздействиям;
compressive [kəmˈpresɪv] strength [streŋθ] – прочность на сжатие;
damp-proof [ˈdæmpˌpruːf] – влагонепроницаемый, водонепроницаемый;

chemical ['kemɪkl] resistant [rɪ'zɪstənt] – химически стойкий;
sewer ['su:ə] – канализационная труба, сточная труба;
retaining [rɪ'teɪnɪŋ] wall [wɔ:l] – подпорная стена;
damp-proof course ['dæmp,pru:f kɔ:s] – гидроизоляционный слой;
low-maintenance [ləʊ'meɪntənəns] – не требующий частого обслуживания и ремонта.

III. Study the model 1 and put the verbs into the Past and Future Simple. Study the model 2 and make the sentences interrogative and negative.

Model 1: Bricks have many properties.

Brick(s) **had** different size.

Brick(s) **will have** various thickness.

Model 2: **Do** bricks have many properties?

Bricks **have** no advantages.

Will bricks **have** various thickness?

These bricks **won't have** various thickness.

1. Brick has reasonable price and durability.
2. Bricks have different size, colour and texture.
3. Engineering bricks have excellent resistance to wear.
4. This brick building has a modern design.
5. Hollow bricks have many advantages.
6. The basic principles of brick-making have never changed.
7. Porous bricks have more economical efficiency than ordinary bricks.
8. Bricks usually have length more than twice width.
9. All bricks have wide application in modern construction.
10. Bricks have been used in many countries for centuries.

IV. What is the function of the verb "to have" in the following word-combinations?

- | | |
|-------------------------------|---------------------|
| 1. has survived | 7. have you ever |
| 2. have never changed | 8. will have |
| 3. have a pleasant appearance | 9. has to make |
| 4. has been influenced by | 10. had finished |
| 5. have some examples | 11. didn't have |
| 6. there has been | 12. have introduced |

V. Put all possible questions to the sentences.

1. The first sun-dried mud bricks date back to 7,000 BC.
2. The Romans introduced kiln fired bricks to the whole Roman Empire.
3. Facing bricks are valued for aesthetic qualities and weather resistance.

VI. Read and translate the text.

BRICK

Brick is an artificial building material made by man of clay, sand and water. It is one of the oldest building materials. The first sun-dried mud bricks date back to 7,000 BC. They were found in southern Turkey.

Historically the use of brick has been influenced by the availability of raw materials. The main material clay can be obtained practically everywhere. The Ancient Egyptians, Mesopotamians and Greeks used sun-dried clay bricks. The Romans perfected brick-making. Using mobile kilns, they introduced kiln fired bricks to the whole Roman Empire, including Britain. However, after the Fall of the Roman Empire there was a gap in major brick production. But it revived in the Middle Ages and since then there has been the development of mass-production techniques and transport systems to deliver the products. In Russia bricks have been used in construction for centuries.

There are practical and economic reasons why the use of brick has survived. Brick is a versatile building material. It is reasonably priced, durable and recyclable. It has good insulating properties, high thermal mass and satisfactory porosity. Moreover, bricks are weather-resistant.

The basic principles of brick-making have never changed. This process is rather simple. The various phases of manufacture are as follows: securing the clay, beneficiation, mixing and forming, drying, firing, and cooling.

There are different kinds of bricks: facing, common, sand-lime, engineering, hollow and porous: reinforced and refractory. Facing bricks are valued for aesthetic qualities and weather resistance. Common bricks are cheap. Hollow and porous bricks are lightweight and more economical than common ones. Engineering bricks have high compressive strength. Besides, they are strong, damp-proof and chemical resistant.

Bricks are of different size, colour and texture. The principal structural defect of brick is its porosity.

Bricks are widely used in construction:

- 1) for bearing elements, for example, walls and foundations;
- 2) for producing aggregates;
- 3) for decoration.

Reinforced and refractory bricks are used in the metallurgy and glass industries for lining furnaces.

Engineering bricks are used for sewers, retaining walls and damp-proof courses.

Brick buildings are low-maintenance and can last for hundreds of years.

VII. Fill in the correct prepositions and translate the sentences into Russian.

1. Brick is an artificial building material made ... man ... clay, sand and water.
2. The first sun-dried mud bricks date back ... 7,000 BC.
3. ... the Fall ... the Roman Empire there was a gap ... major brick production.
4. There are different kinds ... bricks.

5. The raw materials ... bricks are cheap.
6. The process ... manufacture is rather simple.
7. All bricks are ... different size, colour and texture.
8. Bricks are widely used ... construction ... build walls, facades and foundations.
9. Brick structures can last ... hundreds ... years.
10. Bricks have been used ... construction ... centuries ... many countries.

VIII. Translate the sentences into English.

1. Кирпич – искусственный материал, получаемый человеком из глины, песка и воды.
2. Существуют различные виды кирпичей.
3. Кирпич должен обладать прочностью, морозостойкостью, малым водонасыщением, малой теплопроводностью и устойчивостью к коррозии.
4. Основной материал для кирпичей – глина.
5. В производстве кирпича есть следующие стадии: скрепление глины, обработка, смешивание и формование, сушка, обжиг и охлаждение.
6. Основные принципы производства кирпича никогда не менялись.
7. Кирпич используют для возведения конструкционных и конструкционно-теплоизоляционных зданий и сооружений.
8. Кирпичные здания отличаются высокой долговечностью.
9. Кирпич используется в строительстве сотни лет во многих странах.
10. Кирпич – ценный строительный материал.

IX. Learn the dialogue.

A – How are bricks manufactured?

B – The various phases of manufacture are as follows: securing the clay, beneficiation, mixing and forming, drying, firing, and cooling.

A – And where are bricks manufactured in our region?

B – At the Semiluksky brick-making factory, for all I know.

X. Answer the following questions.

1. What building material is the text about?
2. What is brick?
3. What is the history of brick-making?
4. Have the basic principles of brick-making ever changed?
5. Is the process of brick-making simple or complicated?
6. What are the stages in the manufacture of bricks?
7. What properties do bricks have?
8. What kinds of brick are there?
9. Brick structures are low-maintenance, aren't they?
10. Why is brick so popular in modern construction?

XI. Make up a plan of the text.

XII. Sum up what the text said about bricks.

XIII. Speak about brick as the first artificial building material made by man. Make use of the key word combinations and expressions.

The main material clay, can be obtained, practically everywhere, Mesopotamia, Egypt and England, the basic principles of brick-making, the Romans saw its potential, rapid development, due to, properties, transport system, mass-production techniques, practical and economic reasons, the availability of raw materials, kinds of brick, for bearing elements, different kinds of bricks, low-maintenance, can last...

1. There is no doubt that... – Нет сомнения в том, что...
2. I'm quite sure that... – Я совершенно уверен, что ...
3. I consider (think) that... – Я считаю (думаю), что ...
4. In my opinion... – По моему мнению, ...
5. It is necessary to stress... – Важно подчеркнуть ...
6. It has been the result of... – Это явилось результатом...
7. Apart from... – В отличие от ...

LESSON 4

Phonetics: [æ], [ei], [ə:], [ju:]

Grammar: Simple Passive. Adverbs

Text: Aggregates. Заполнители

I. Read and translate the following words into Russian:

aspect, gravel, sand, fact, impact, factory, plan, panel, rapid, standard, attractive, practical, aggregate, expand, exam, gas;
name, aim, say, take, place, stage, day, grey, they, rate, clay, obtain, basic, eight, weight, able, again, wait, date;
serve, term, certain, person, purpose, inert, firm, burn, first, third, perfect, urgent;
new, few, student, duty, super, produce, view, unit, using, news.

II. Learn the vocabulary:

aggregate ['ægrɪgət] – заполнитель;
inert [ɪ'nɜ:t] substances ['sʌbstənsɪz] – инертные вещества;
to account for [ə'kaʊnt] – составлять;
per cent, percent [pə'sent] – процент;
fine [faɪn] – мелкий;
coarse [kɔ:s] – крупный;
to pass [pɑ:s] – проходить;
mesh [meʃ] – сетка;

variety [və'raɪəti] – разнообразие;
 various ['veəriəs] – различный;
 crushed [krʌʃt] stone [stəʊn] – дробленый камень, щебень;
 drainage ['dreɪnɪdʒ] layer ['leɪə] – дренажный слой;
 construction [kən'strʌkʃn] fill [fɪl] – строительная насыпь;
 crushed [krʌʃt] brick [brɪk] – кирпичный щебень;
 heavy ['hevi] – тяжелый;
 lightweight ['laɪtweɪt] – легковесный;
 dense [dens] – плотный, густой;
 cohesion [kəʊ'hi:ʒn] – сцепление;
 expanded [ɪk'spændɪd] clay [kleɪ] – вспученная глина, керамзит;
 foamed [fəʊmd] slag [slæg] – вспененный шлак, термозит;
 ash [æʃ] – зола;
 bulk [bʌlk] density ['densɪti] – объемный вес;
 vermiculite [vɜ:'mɪkjʊ'laɪt] – вермикулит;
 mica ['maɪkə] – слюда;
 perlite ['pɜ:lɑɪt] – перлит;
 agglomerite [ə'glɒpəraɪt] – аглопорит;
 foam ceralite – пенокералит;
 recycled [ˌri:'saɪkld] aggregates – переработанные заполнители;
 conventional [kən'venʃənl] – традиционный;
 cost-effective [ˌkɒst ɪ'fektɪv] – рентабельный, экономически оправданный, эффективный и экономичный.

III. Study the model 1 and put the verbs into the Past and Future Simple.
 Study the model 2 and make the sentences interrogative and negative.

Model 1: Aggregates *are used* for various purposes.

Aggregates *were used* in the past.

Aggregates *will be used* to produce concretes.

Model 2: *Are* aggregates *divided* into two classes?

Aggregates *are not divided* into two classes.

Were aggregated *divided* into 5 classes?

Aggregates *were not divided* into 5 classes?

Will aggregates *be divided* into 3 classes?

Aggregates *won't be divided* into 3 classes.

1. The term «aggregate» is used to describe inert substances, which are mixed with cement to produce concretes.
2. Cements are not used alone but they are always mixed with inert substances.
3. Aggregates are graded in size from fine to coarse.
4. Inert substances are called fine if they pass a 3/16 inch mesh.
5. Others are called coarse aggregates.
6. Aggregates are divided into heavy and lightweight

7. Expanded clay, perlite and ash are used to produce lightweight concretes.
8. Crushed rock, sand and gravel are used to produce dense concretes.
9. Aggregates are very important for producing concretes.
10. Concrete is made from cement, fine aggregate (sand), coarse aggregate (gravel) and water.

IV. Give synonyms to the following words and translate them into Russian.

Model: *chief – main;* главный, основной

To divide, usual, substance, common, to use, various, to prepare, purpose, to build, artificial, important, to call, rapid, to obtain.

V. Form adverbs adding the suffix «-ly» and translate them into Russian.

Model: *stem + ly = adverb (корень + суффикс -ly = наречие)*

broad – **broadly**; широкий – широко

-ly: slow, wide, usual, normal, special, practical, quick, cheap, formal, main, essential, natural, close, certain, bad, efficient, general, complete.

VI. Read and translate the text.

AGGREGATES

Aggregates are inert substances which are mixed with cement to produce concrete. They account for 60 to 75 per cent of the total volume of concrete. There are fine and coarse aggregates. Fine aggregates are those which pass a 3/16 inch mesh. Others are called coarse aggregates. A wide variety of aggregates is used for various purposes. Aggregates are divided into two broad classes: natural heavy aggregates and artificial lightweight ones. The most usual heavy aggregates are sand, gravel, crushed stone. The main use of gravel and sand is for concrete. Other uses for sand include mortar and for gravel include drainage layers or construction fill. Crushed brick also comes into heavy class. Builders today say that crushed stone provides better cohesion in the mix and gives greater strength to concrete than gravel.

Heavy aggregates are used to produce dense concretes. Lightweight aggregates are used to produce lightweight concretes. They are: expanded clay, foamed slag, ash. In recent years new porous aggregates with low bulk density have appeared.

Expanded clay is a light gravel made of clay through special processing. Its one cubic metre varies between 400-700 kg. Vermiculite is also a porous light mineral of the mica family. Perlite is a glass-like substance of volcanic origin found in great quantities in Siberia and the Far East. At the temperature of about 1200°C it turns into a light gravel, a cubic metre of which weighs 200-400 kg. Aggloporite, foamed slag and foam ceralite are also widely used both for lightweight concretes and insulating materials.

Nowadays recycled aggregates are becoming a popular alternative to conventional ones because they are environmentally friendly and cost-effective.

VII. Fill in the correct prepositions and translate the sentences into Russian.

1. Aggregates are mixed ... cement ... produce concrete.
2. Inert substances are used ... various purposes.
3. They can be divided ... two broad classes.
4. ... special purposes crushed stone is generally used.
5. Crushed rock and crushed brick come ... heavy class.
6. Ash, expanded clay, foamed slag come ... lightweight group.
7. The application ... aggregates reduces the cost ... the resulting material.
8. Lightweight aggregates are used ... produce lightweight concretes.
9. Nowadays recycled aggregates are becoming a popular alternative ... conventional ones.
10. All aggregates are important ... construction.

VIII. Translate the sentences into English.

1. Для приготовления бетона используют различные заполнители.
2. Существует множество видов этих инертных веществ.
3. Заполнители, которые проходят сквозь сито с ячейками 3/16 дюйма, называются мелкими.
4. Остальные входят в группу крупных заполнителей.
5. Дробленый камень используется как тяжелый заполнитель.
6. Тяжелые заполнители используют для производства плотных бетонов.
7. Для производства легких бетонов используют различные вспененные материалы.
8. Сейчас существуют новые легкие пористые заполнители – вермикулит, перлит, термозит и другие.
9. Заполнители влияют на качество растворов и бетонов.
10. Пористые заполнители имеют малый объемный вес.

IX. Put all possible questions to the sentences.

1. Aggregates can be divided into two broad classes: heavy and lightweight.
2. Crushed brick comes into heavy class.
3. Lightweight aggregates are used to produce lightweight concretes.

X. Answer the following questions.

1. What building material is the text about?
2. What are aggregates?
3. What are aggregates used for?
4. What are fine aggregates?
5. What are coarse aggregates?

6. How are aggregates classified?
7. What heavy aggregates do you know?
8. What can you say about lightweight aggregates?
9. What aggregates are used to produce dense concretes?
10. What aggregates are used to produce lightweight concretes?

XI. Write a summary of the text.

XII. Speak about aggregates as common admixtures to a concrete mix.

LESSON 5

Phonetics: [i], [θ], [ð]

Grammar: Active and Passive

Text: Concrete. Бетон

I. Read and translate the following words into Russian:

system, brick, mix, which, give, gypsum, is, timber, will, little, fill, build, simple, figure, million, width, symbol, carry, plenty, since; method, monolithic, month, strength, width, think, thermal, thank, fifth, thick, synthetic, bath, south, depth, thought, length, theory; they, that, with, there, then, those, within, thus, therefore, their, themselves, without, another, mother, further, bathe, other.

II. Learn the vocabulary:

concrete ['kɒŋkri:t] – бетон, бетонировать;
 versatile ['vɜ:sətəɪl] – многофункциональный;
 reinforced concrete [ˌri:ɪn fə:st 'kɒŋkri:t] – железобетон;
 prestressed [ˌpri:'strest] concrete – предварительно напряженный бетон;
 volcanic [vɒl'kænik] ash [æʃ] – вулканический пепел;
 compressive [kəm'presɪv] strength [streŋθ] – прочность на сжатие;
 acid ['æsɪd] – кислота;
 pervious ['pɜ:vɪəs] concrete – проницаемый бетон;
 high-strength [ˌhaɪ'streŋθ] – высокопрочный;
 hardening ['hɑ:dniŋ] – твердение;
 cellular ['seljələ] concrete – ячеистый бетон;
 polymer ['pɒlɪmə] concrete – полимербетон;
 glass [glɑ:s] concrete – стеклобетон;
 asphalt ['æsfælt] concrete – асфальтобетон;
 gypsum ['dʒɪpsəm] concrete – гипсобетон;

high-performance [ˌhaɪ pəˈfɔːməns] concrete – высокоэффективный бетон;
 construction [kənˈstrʌkʃn] site [saɪt] – строительная площадка;
 in-situ [ɪn ˈsɪtjuː; ɪn-ˈsaɪtjuː] concrete – монолитный бетон;
 precast [ˌpriːˈkɑːst] concrete – сборный бетон;
 to influence [ˈɪnfluəns] – влиять на, воздействовать;
 water-cement ratio [ˈreɪʃiəʊ] – водоцементное отношение;
 quality [ˈkwɒlɪti] – качество;
 supporting [səˈpɔːtɪŋ] elements – опорные элементы;
 slab [slæb] – плита;
 hydraulic engineering structures [haɪˈdrɒlɪk] – гидротехнические сооружения;
 channel [ˈtʃænl] – канал;
 road surfaces [ˈsɜːfɪsɪz] – дорожные покрытия;
 base [beɪs] – основание;
 to tackle [ˈtækl] the problem – решать проблему;
 self-healing [ˌself ˈhiːlɪŋ] concrete – самовосстанавливающийся бетон;
 pollution [pəˈluːʃn]-eating concrete – бетон, поглощающий загрязнения;
 bio [baɪəʊ]-receptive [rɪˈseptɪv] concrete – биорецептивный бетон.

III. Study the Tenses in the Passive Voice.

The Passive:

to be + past participle (pp) (причастие прошедшего времени, 3-я форма глагола)

Tense	Active	Passive
Present Simple: am/is/are + pp	The builders make concrete.	Concrete is made by the builders.
Present Continuous: am/is/are + being + pp	The builders are making concrete.	Concrete is being made by the builders.
Past Simple: was/were + pp	The builders made concrete.	Concrete was made by the builders.
Past Continuous: was/were + being + pp	The builders were making concrete.	Concrete was being made by the builders.
Present Perfect: have/has + been + pp	The builders have made concrete.	Concrete has been made by the builders.
Past Perfect: had + been + pp	The builders had made concrete.	Concrete had been made by the builders.
Future Simple: will + be + pp	The builders will make concrete.	Concrete will be made by the builders.
Future Perfect: will + have + been + pp	The builders will have made concrete.	Concrete will have been made by the builders.
Present infinitive: to be + pp	The builders have to make concrete.	Concrete has to be made by the builders.
Modals: modal + be + pp	The builders can make concrete.	Concrete can be made by the builders.

Note! Отрицательная форма глагола в пассивном залоге образуется с помощью частицы **not**: Concrete **was not made** yesterday.

В вопросительных предложениях в пассивном залоге необходимо вынести вспомогательный глагол на первое место (в общих вопросах): *Is concrete being made now?* и на второе место (в специальных вопросах): *When will concrete be made?*

IV. Rewrite the sentences in the passive.

Model:

Active: Builders **use** concrete practically everywhere.

Passive: Concrete **is used** practically everywhere by builders.

1. The Egyptians did not know cement in old times.
2. They used clay for producing concrete.
3. The Romans and the Greeks made concrete of gypsum and lime.
4. For what structures did the Egyptians, Romans and Greeks use concrete?
5. Builders today produce concrete by mixing water, cement and aggregates.
6. We know different kinds of concrete today.
7. Many factors influence the strength of any concrete.
8. Students prepare concrete during their practice.
9. We use different methods in producing concrete.
10. Builders consider concrete very important in modern construction.

V. Compare the sentences and translate them into Russian.

Model: I *invite* my friends on Sundays.
Я *приглашаю* друзей по воскресеньям.

I *am invited* by my friends on Sundays.
Меня *приглашают* друзья по воскресеньям.

1. He told them the latest news.
He was told the latest news.
2. I will buy a new dictionary.
I will be bought a new dictionary.
3. My friend helps me with the calculations.
My friend is helped by me with the calculations.
4. The dean will receive you on Tuesday.
You will be received by the dean on Tuesday.
5. She asks many questions before the exam.
She is asked many questions before the exam.
6. They recommend to attend the lectures in Physics.
They are recommended to attend the lectures in Physics.

VI. Translate the sentences into English.

1. Обычно студентов экзаменуют (to examine) в аудитории 345.
2. Дорогу построили (to build) в прошлом году.
3. Его доклад слушали (to listen to) с большим интересом.
4. Вас всегда ждут (to wait for).
5. Письмо отправят (to send) завтра.
6. Новый спортивный комплекс откроют (to open) в нашем районе.
7. Ей не обещали (not to promise) новую книгу.
8. За инженером послали (to send for).
9. Им покажут (to show) новый фильм завтра.
10. Каждую неделю нас информируют (to inform) о строительстве моста.

VII. Give synonyms to the following words and translate them into Russian.

Model: to use = to utilize - использовать

To construct, to vary, different, aim, material, ordinary, man-made, to classify, to apply, general, to make, rapid, to resist, to speak, special.

VIII. Read and translate the text.

CONCRETE

Concrete is the most widely used construction material in the world. This versatile building material led to great innovations: reinforced concrete and prestressed concrete.

It was used by the Egyptians, Greeks and Romans in the construction of roads, tunnels, bath houses, bridges, harbours, aqueducts, town walls and even underwater structures. Some of them have survived, for example, the Pantheon, which serves as the most wonderful surviving example of Roman concrete. Despite the fact that the Pantheon was built 19 centuries ago, it still looks modern today. Besides, it is the largest non-reinforced concrete dome in the world. The key to the durability of Roman concrete was the use of volcanic ash and seawater.

Concrete was made of clay and later of gypsum and lime because cement was not known in those times.

At present concrete is made by mixing water, cement, fine aggregate (sand) and coarse aggregate (gravel).

There are four stages in producing concrete: 1) preparing the raw materials 2) their mixing, 3) forming and 4) hardening. Concrete has the following properties: durability, high compressive strength, hardness, resistance to acid, water, air, gas, fire, corrosion, and heat. Concrete can be heavyweight or lightweight.

There are different types of concrete: high-strength concrete, polymer concrete, glass concrete, cellular concrete, pervious concrete, asphalt concrete, gypsum concrete, high-performance concrete, etc.

There are different methods in producing concrete. It may be prepared right at the construction site and is called in-situ concrete. When concrete is prepared at a factory, it is called precast.

The following factors affect the strength of any concrete:

- the activity of cement;
- the water-cement ratio;
- the quality of aggregates;
- the hardening conditions.

Nowadays concrete is widely used in construction:

- 1) for supporting elements of buildings: beams, floors, slabs, panels, columns;
- 2) for hydraulic engineering structures: dams, facing of channels;
- 3) for road surfaces and bases.

Concrete is of vital importance in building new homes, hospitals, schools and roads. Besides providing people with clean water and energy, it protects them from fire and flooding. However, concrete is not eco-friendly. To tackle the problem of climate change, self-healing, pollution-eating and bio-receptive concretes are being developed.

IX. Fill in the correct prepositions and translate the sentences into Russian.

1. Concrete is one ... the constructive building materials.
2. Concrete is a mixture ... water, cement and aggregates.
3. There are four stages ... producing concrete.
4. Concrete may be prepared right ... a building site.
5. It may also be prepared ... a factory.
6. The kind ... concrete depends ... the aggregates used.
7. Concrete has many advantages ... other building materials.
8. The strength ... any concrete is influenced ... many factors.
9. Concrete is widely used ... construction ... supporting elements.
10. Concrete is ... vital importance ... building new hospitals, schools and roads.

X. Translate the sentences into English.

1. Бетон – один из самых многофункциональных строительных материалов.
2. Его издавна использовали египтяне, греки и римляне.
3. Ключом к долговечности римского бетона являлось использование вулканического пепла и морской воды.
4. Бетон – композиционный материал, полученный в результате твердения рационально подобранной смеси из вяжущего материала, заполнителя и воды.
5. В производстве бетона четыре стадии: 1) приготовление сырья, 2) его перемешивание, 3) формование и 4) твердение.
6. Плотность бетона зависит от плотности цементного камня, плотности заполнителей и степени уплотнения.
7. Конструкции из монолитного бетона изготавливают непосредственно на строительной площадке, а сборные конструкции – на заводе.

8. Бетон является главным строительным материалом, который применяют во всех областях строительства.

9. Бетон не является экологически чистым материалом.

10. Чтобы решить проблему изменения климата, разрабатываются самовосстанавливающийся, биорецептивный и бетон, поглощающий загрязнения.

XI. Learn the dialogues.

1. A – What is concrete?

B – Concrete is one of the constructive building materials.

A – And who was the first to use concrete?

B – It was used by the Egyptians, the Greeks and the Romans.

2. A – Why have some ancient structures made of concrete survived?

B – Due to the valuable properties of concrete.

3. A – And how was concrete made when there was no cement?

B – In old times concrete was made of clay and later of gypsum and lime.

XII. Answer the following questions.

1. What building material is the text about?

2. What is concrete?

3. What stages are there in producing concrete?

4. What properties does concrete have?

5. What types of concrete do you know?

6. What does the kind of concrete depend on?

7. What methods of producing concrete do you know?

8. What factors influence the strength of any concrete?

9. Where is concrete widely used today?

10. Why is concrete one of the main building materials in construction world?

XIII. Speak about concrete as one of the main building materials today. Make use of the key words and expressions.

The most widely used construction material, its composition, stages in producing, the resulting material, the kind of concrete, depends on, methods in producing, the strength of any concrete, is influenced by, wide application, will be required in future, concrete structures, cost-effective, safe and sound = strong.

1. I'll speak about... – Я расскажу о ...

2. If I'm not mistaken... – Если я не ошибаюсь, ...

3. Now just a few words about... – Сейчас несколько слов о ...

4. The properties of...are... – Свойствами ... являются ...

5. It is no doubt that... – Нет сомнения в том, что ...

6. In conclusion I'd like to say that... – В заключение мне бы хотелось сказать, что...

LESSON 6

Phonetics: Compare the words and their meanings

Grammar: Modal Verbs

Text: Mortar. Строительный раствор

I. Read the following words and compare the difference in their meanings:

Building ≠ binding; form ≠ firm ≠ from; four ≠ for, modal ≠ model; mortar ≠ motor, past ≠ paste ≠ part ≠ pass; poor ≠ powder ≠ power, product ≠ project; strength ≠ strange; time ≠ term; there ≠ their; walk ≠ work ≠ week; where ≠ wear.

II. Learn the vocabulary:

mortar ['mɔ:tə] – строительный раствор;

mixture ['mɪkstʃə] – смесь;

to compose [kəm'pəʊz] – составлять;

according to [ə'kɔ:dn̩ tə] – согласно;

to apply [ə'plai] – применять;

jointing of panels ['dʒɔɪntɪŋ] – соединение панелей;

brickwork ['brɪkwɜ:k] – кирпичная кладка;

plastering ['plɑ:stərɪŋ] – штукатурка;

lime [laɪm] – известь;

to provide [prə'vaɪd] – обеспечивать, предоставлять, давать;

evidence ['eɪdəns] – доказательство, подтверждение;

to decline [dɪ'klaɪn] – уменьшаться, идти на убыль;

in favour of ['feɪvə] – в пользу;

revival [rɪ'vaɪvəl] – возрождение;

conservation [ˌkɒnsə'veɪʃn] plastering ['plɑ:stərɪŋ] – реставрационная штукатурка;

breathable ['brɪ:ðəbl̩] – воздухопроницаемый;

recyclable [ˌrɪ:'saɪkləbl̩] – пригодный для вторичной переработки ;

compatible with [kəm'pætɪbl̩] – совместимый с... ;

straw [strɔ:] – солома;

water reed [rɪ:d] – речной тростник;

to prepare [prɪ'reə] – приготавливать;

reduction [rɪ'dʌkʃn̩] – уменьшение;

volume ['vɒljʊ:m] – объем;

while [waɪl] – пока, в то время как, при;

to take [teɪk] place [pleɪs] – происходить;

to calculate [ˌkælkjuleɪt] – рассчитывать;

to require [rɪ'kwaɪə] – требовать;

ingredient [ɪn'grɪ:diənt] – составная часть;

masonry ['meɪsənri] – каменная кладка;

to bond [bɒnd] = to tie [taɪ] – связывать, соединять;
 to seal [si:l] – уплотнять;
 to anchor [ˈæŋkə] – закреплять;
 long-lasting [ˌlɒŋ ˈlɑ:stɪŋ] – долговечный.

III. Study the information about Modal Verbs and their meanings.

Модальные глаголы всегда используются в паре со смысловым глаголом. Именно смысловой глагол показывает, о каком действии идет речь.

Модальные глаголы *can*, *may*, *must* не обозначают действие, а выражают отношение к нему говорящего, т.е. возможность, вероятность или необходимость совершения действия. Само действие выражается инфинитивом смыслового глагола без частицы *to*, следующим за модальным глаголом.

Модальный глагол	Модальное значение	Примеры
can (могу, может) could (мог, могли) to be able to (смогут, сможет)	способность, возможность, сомнение	We can meet at 5 o'clock. Мы можем встретиться в 5 часов. She couldn't help John. Она не смогла помочь Джону. They will be able to do the work themselves. Они смогут сделать эту работу сами.
may (можно, можете) might (мог, могли) to be allowed to (разрешат, позволят)	возможность, разрешение, предположение	May I use your mobile phone? Можно воспользоваться вашим телефоном? You might visit Ann on Sunday. Вы могли навестить Анну в воскресенье. He'll be allowed to continue the experiment. Ему разрешат продолжить этот эксперимент.
must (должен, обязан, носит личностный характер, мы сами решаем, что мы должны делать)	обязанность, необходимость по обстоятельствам	I must study well. Я должен хорошо учиться.
to have to (быть вынужденным, быть должным, надо) to be to (должен был)	необходимость в связи с договоренностью	He had to do his duty. Он должен был выполнить свой долг. He was to have graduated in June. Он должен был закончить учебу в июне (но не закончил).

IV. Translate the sentences into Russian. Explain the modal verbs' meaning.

1. Every engineer must know at least one foreign language.
2. Who can prepare cement mortar?
3. Are students allowed to use this device for calculations?
4. You may not go away now.
5. They can't understand the essence of this phenomenon.
6. Who must review all the lectures before the exam in Chemistry?
7. You may keep this book as long as you need it.
8. The experiment needn't be finished today.
9. Who had to work over this project?
10. She might have heard about it.

V. Express obligation, possibility or permission.

1. Mortar (может состоять) of a binding material, fine aggregates and water.
2. Mortars (можно классифицировать) according to their applications and kind of a binding material.
3. Any student of our group (может приготовить) cement mortar.
4. To prepare mortar you (можете взять) lime or gypsum.
5. You (разрешат) to mix the raw materials yourselves?
6. While mortars are being prepared, reduction in volume (должно произойти).
7. All students (должны уметь сделать) the calculation of this reduction.
8. Cement mortar (можно применять) for jointing of panels, for brickwork or for plastering.
9. Who (мог разрешить проводить) you this experiment?
10. Students (обязаны хорошо учиться) to get a scholarship.

VI. Give derivatives of the following verbs and translate them into Russian.

Model: to use - user, useful, useless, useness, misuse, usage.

To form, to build, to differ, to crack, to place, to make, to create.

VII. Read and translate the text.

MORTAR

Mortar is a mixture composed of a binding material, fine aggregates and water. Mortars are classified according to their applications and kind of a binding material, which is used to produce them. Mortar may be applied for jointing of panels, for brickwork or for plastering. To prepare mortar different binding materials are used. They are: lime, gypsum, cement.

The earliest known mortar was used by the ancient Egyptians in the construction of the pyramids and was made from gypsum. Lime mortar is created by mixing lime, sand and water. It has been used for building for 10,000 years. The Roman Empire, for example, was built using lime mortar. The Tower of London provides evidence of the durability of lime mortar. However, its use declined in favour of cement mortar during the late 19th and early 20th centuries because cement sets faster, allowing construction to carry on throughout the year. In recent years lime mortar has enjoyed a revival in both conservation plastering and modern buildings because lime mortar is more environmentally friendly than cement mortar. Moreover, lime mortar is breathable, recyclable and compatible with eco-friendly building materials such as timber, straw and water reed.

While mortar is being prepared, reduction in volume takes place. The calculation of this reduction is very important for builders. They must and can calculate how much of each material is required to produce a given volume of mortar. For most mortars the reduction in volume on mixing is 1-2 mm per 1 m of the final product. While mortar represents only a small proportion of the total wall area in masonry construction (approximately 7%), its influence on the performance of a wall is significant. Mortar serves many important functions: it sticks two masonry units together, prevents small movements within a wall, stops water from getting into the wall, removes slight differences between unit sizes, and bonds steel reinforcement, ties and anchors so that all elements perform as a unified whole.

Mortar continues to play an important role in modern construction because of the long-lasting nature of this material.

VIII. Fill in the correct prepositions and translate the sentences into Russian.

1. Building mortar is a mixture composed ... a binding material, fine aggregates and water.
2. They are classified ... their applications and kind ... a binding material.
3. Mortar may be applied ... brickwork and ... plastering.
4. ... prepare mortars different binding materials are used.
5. Reduction ... volume takes place ... mixing.
6. The calculation ... this reduction is very important ... builders.
7. They must calculate the amount ... materials ... produce a given volume ... mortar.
8. The reduction ... volume ... mixing is 1/2mm per 1 m.
9. Lime mortar is breathable, recyclable and compatible ... eco-friendly building materials.
10. Mortar stops water ... getting ... the wall.

IX. Translate the sentences into English.

1. Строительный раствор – это смесь из вяжущего материала, мелких заполнителей и воды.
2. Он широко используется в строительстве для соединения панелей, кирпичной кладки и штукатурки.
3. В качестве вяжущих материалов используют известь, гипс и цемент.
4. Древние египтяне использовали гипсовый раствор при строительстве пирамид.
5. Известковый раствор получают путем смешивания извести, песка и воды.
6. При приготовлении строительный раствор уменьшается в объеме.
7. Строители должны знать пропорции каждого составляющего для получения заданного количества раствора.
8. Для большинства строительных растворов уменьшение в объеме составляет 1/2мм на 1м.
9. Строительный раствор придает прочность каменным и кирпичным кладкам.
10. Строительный раствор продолжает играть важную роль в современном строительстве.

X. Put all possible questions to the sentences:

1. Gypsum mortar was used by the ancient Egyptians in the construction of the pyramids.
2. The use of lime mortar declined during the late 19th and early 20th centuries.
3. Mortar serves many important functions.

XI. Answer the following questions:

1. What building material is the text about?
2. What is mortar?
3. How are mortars classified?
4. Where is mortar applied?
5. What binding materials are used to prepare mortar?
6. Why did cement mortar replace lime mortar?
7. Where and why has lime mortar enjoyed a revival in recent years?
8. What takes place while mortar is being prepared?
9. What is the reduction in volume on mixing for most mortars?
10. What functions does mortar serve?

XII. Write a summary of the text.

XIII. Speak about mortar.

LESSON 7

Phonetics: Compare the words and their meanings

Grammar: Adjectives and adverbs. Degrees of Comparison

Text: Stone. Камень

I. Read the following words and compare the difference in their meanings:

also ≠ although; bath ≠ bathe; bearing ≠ burning ≠ building; famous ≠ favourite; has ≠ his; since ≠ science; than ≠ then; world ≠ word.

II. Learn the vocabulary:

known [nəʊn] – известный;

variety [və'raɪəti] – множество;

rock [rɒk] deposits [dɪ'pɒzɪts] – месторождения горных пород;

availability [ə'veɪlə'bɪləti] – наличие, доступность;

fire resistance ['faɪə,rɪzɪstəns] – огнестойкость;

weather resistance ['weðə,rɪzɪstəns] – устойчивость к атмосферным воздействиям;

post [pəʊst] – стойка;

lintel ['lɪntl] – перемычка, архитрав;

post-and-lintel system – стоечно-балочная система;

beam [bi:m] – балка;

to remain [rɪ'meɪn] – оставаться;

engineering [ˌendʒɪ'niəriŋ] – строительство;

to cover ['kʌvə] – охватывать;

aqueduct ['ækwɪdʌkt] – акведук, водопровод;

to reflect [rɪ'flekt] – отражать, отображать;

pattern of life ['pætɪn] – образ жизни;

to span [spæn] – перекрывать пролет;

semicircle [semɪs:kɪkl] – полукруг;

half-sphere ['hɑ:f sfiə] – полусфера;

geometric figures [ˌdʒɪ:ə'metɪk 'fɪgəz] – геометрические фигуры;

architecture ['ɑ:kɪtektʃə] – архитектура, зодчество;

igneous rock ['ɪɡniəs] – магматическая горная порода;

granite ['grænit] – гранит;

sedimentary [ˌsedɪ'mentəri] rock – осадочная горная порода;

shale [ʃeɪl] – глинистый сланец;

sandstone ['sændstəʊn] – песчаник;

metamorphic [ˌmetə'mɔ:fɪk] rock – метаморфическая горная порода;

marble ['mɑ:bl] – мрамор;

natural stones ['nætʃrəl] – природные камни;

building ['bɪldɪŋ] purposes ['pʊz:pəʊzɪz] – строительные цели;

roofing ['ru:fɪŋ] – кровельный материал;

flooring ['flɔ:ɪŋ] – напольное покрытие;

attractive appearance [ə'træktɪv ə'pɪərəns] – привлекательный внешний вид;

III. Study the information about the degrees of comparison of adjectives and adverbs.

Прилагательные (Adjectives)

Правило (Rule)	Прилагательное (Adjective)	Сравнительная степень (Comparative)	Превосходная степень (Superlative)
1. Односложные прилагательные образуют сравнительную степень при помощи суффикса -er , превосходную степень — при помощи суффикса -est .	<i>short</i> <i>big</i>	<i>shorter (than)</i> <i>bigger (than)</i>	<i>the shortest (of/in)</i> <i>the biggest (of/in)</i>
2. Двусложные прилагательные, оканчивающиеся на -er , -ly , -y , -w также образуют сравнительную степень при помощи суффикса -er , превосходную степень — при помощи суффикса -est .	<i>clever</i> <i>lively</i> <i>heavy</i> <i>shallow</i>	<i>cleverer (than)</i> <i>livelier (than)</i> <i>heavier (than)</i> <i>shallower (than)</i>	<i>the cleverest (of/in)</i> <i>the liveliest (of/in)</i> <i>the heaviest (of/in)</i> <i>the shallowest (of/in)</i>
3. Двусложные и многосложные прилагательные образуют сравнительную степень при помощи слов more — более и less — менее, а превосходную степень — при помощи слов most — наиболее, самый и least — наименее.	<i>special</i> <i>interesting</i> <i>interesting</i>	<i>more special (than)</i> <i>more interesting (than)</i> <i>less interesting (than)</i>	<i>the most special (of/in)</i> <i>the most interesting (of/in)</i> <i>the least interesting (of/in)</i>

Note! Некоторые двусложные прилагательные образуют сравнительную и превосходную степени двумя способами: с помощью добавления к основе слова суффиксов **-er**, **-est** и с помощью специальных слов **more**, **most**.

Examples: friendly, clever, stupid, narrow, gentle, quiet, simple, common, cruel, pleasant, polite, etc.

friendly – friendlier – the friendliest
ALSO
friendly – more friendly – the most friendly

Наречия (Adverbs)

Правило (Rule)	Наречие (Adverb)	Сравнительная степень (Comparative)	Превосходная степень (Superlative)
1. Односложные наречия, а также наречие early образуют сравнительную степень при помощи суффикса -er , превосходную степень — при помощи суффикса -est .	<i>hard</i>	<i>harder</i>	<i>(the) hardest</i>
	<i>soon</i>	<i>sooner</i>	<i>(the) soonest</i>
	<i>early</i>	<i>earlier</i>	<i>(the) earliest</i>
2. Двусложные наречия, а также наречия, образованные от прилагательных при помощи суффикса -ly , образуют сравнительную степень при помощи more , а превосходную — при помощи most .	<i>often</i>	<i>more often</i>	<i>(the) most often</i>
	<i>safely</i>	<i>more safely</i>	<i>(the) most safely</i>
	<i>easily</i>	<i>more easily</i>	<i>(the) most easily</i>

Нерегулярные формы сравнительной и превосходной степеней прилагательных и наречий

Прилагательное/Наречие (Adjective/Adverb)	Сравнительная степень (Comparative)	Превосходная степень (Superlative)
good/well	<i>better</i>	<i>the best</i>
bad/badly	<i>worse</i>	<i>the worst</i>
much/many/a lot of	<i>more</i>	<i>the most</i>
little	<i>less</i>	<i>the least</i>
far	<i>further/farther</i>	<i>the furthest/the farthest</i>

Note! further/farther (*adverb*) = *longer (in distance)*

He lives *further/farther* away than me.

further (*adjective*) = *more*

For *further* details, consult our website.

IV. Write the comparative and superlative forms of the following adjectives and adverbs. Translate them into Russian.

broad	high	old	hard	far
famous	rich	decorative	attractive	wide
early	different	durable	hollow	difficult
important	deep	good	comfortable	fine
loud	polite	slowly	quietly	friendly

V. Fill in the gaps with the *comparative* or *superlative* form of the adjectives in brackets and translate the sentences into Russian.

1. Dry stone is the ... (early) form of stone construction.
2. Natural stone is one of the ... (durable) of all construction materials.
3. Stone is ... (durable) than timber.
4. Natural stone needs ... (little) maintenance than brickwork.
5. Stone is the ... (old) building material known to man.
6. The Roman stone-building covered a ... (wide) range of uses than those of the Greeks.
7. Stone is ... (eco-friendly) than concrete.
8. Stone is one of the... (important) natural resources.
9. Stone has a ... (high) compressive strength than concrete.
10. Granite is one of the ... (dense) of all stones.

VI. Practice and remember. Find the name of the people who live in:

- | | |
|---------------------|-------------------|
| 1) China? | a) the Englishmen |
| 2) America? | b) the Frenchmen |
| 3) Egypt? | c) the Danes |
| 4) England? | d) the Greeks |
| 5) France? | e) the Chinese |
| 6) Germany? | f) the Romans |
| 7) Greece? | g) the Egyptians |
| 8) Rome? | h) the Dutch |
| 9) The Netherlands? | i) the Germans |
| 10) Denmark? | j) the Americans |

VII. Match the English terms with their Russian equivalents.

- | | |
|-------------------------------|-----------------------------------|
| 1) external walls | a) природные камни |
| 2) high mechanical strength | b) Римская архитектура |
| 3) the pattern of life | c) геометрические фигуры |
| 4) natural stones | d) внешние стены |
| 5) artificial stones | e) стоечно-балочная система |
| 6) attractive appearance | f) образ жизни |
| 7) geometric figures | g) искусственные камни |
| 8) the post-and-lintel system | h) огнестойкость |
| 9) the Roman architecture | i) привлекательный внешний вид |
| 10) fire resistance | j) высокая механическая прочность |

VIII. Read and translate the text.

STONE



Fig. 1. Stonehenge, an example of early post-and-lintel construction

Stone is the oldest building material known to man. As most continents had a wide variety of rock deposits, stone has been used in construction since the earliest days.

The main characteristics of stone are its availability, mechanical strength, high compressive strength, durability, weather and fire resistance. Almost all famous buildings of classical times, of the Medieval and Renaissance periods were erected of stone.

The Egyptians used stones in two ways: 1) for external walls of houses and 2) for Temples and Palaces - the first buildings to use the post-and-lintel system. It is a simple form of construction involving posts carrying horizontal beams, or lintels. The famous Pyramids built of stone were the highest structures in the world for 5,000 years. But they still remain monuments to engineering rather than architecture.

The Roman stone-building covered a wider range of uses than those of the Greeks. Baths, triumphal arches, open forums, aqueducts, and stone bridges reflected the broader Roman pattern of life. The Romans used rounded arches, made of stone. Arches are capable of spanning much wider openings and carrying a much greater load than horizontal beams, or lintels. The Romans also gave their buildings a richer mix of detail. The circle, semicircle and half-sphere became the principal geometric figures upon which the Roman architecture was based.

Any stone can be placed into one of three groups: igneous, sedimentary or metamorphic rock. Granite is an igneous rock. Examples of sedimentary rocks are chalk, limestone, shale, and sandstone. Metamorphic rocks are formed from other rocks that are changed because of heat or pressure. Marble, for example, is a metamorphic rock that forms from limestone.

Nowadays natural stones are also widely used for building purposes:

- 1) for bearing elements of buildings, for example, walls, foundations, columns, and arches;
- 2) for roofing and flooring;
- 2) for producing different kinds of aggregates;
- 3) for decoration, for example, granite and marble are often used, for the reason of their durability and attractive appearance.

The use of stone in modern construction is becoming increasingly popular because natural stone is an eco-friendly building material.

IX. Fill in the correct prepositions and translate the sentences into Russian.

1. Stone is the oldest building material known ... man.
2. A wide variety ... rock deposits has been used ... construction ... the earliest days.
3. Stones are characterized ... their availability, high compressive strength and weather - and fire-resistance.
4. The famous Pyramids remain monuments ... engineering rather than architecture.
5. ... some places stone was used ... the scarcity ... timber.
6. Slate, which is a metamorphic rock, has been used ... a natural roofing material ... hundreds ... years.
7. Granite is used particularly ... basements, columns, steps and ... the entire facades.
8. Granite possesses a wide range ... colours: grey, yellow, pink and deep red.
9. White and black marbles are used ... ornamental decoration.
10. Where would you recommend ... use stones ... construction?

X. Translate the sentences into English.

1. Одним из наиболее древних строительных материалов является природный камень.
2. Каменные конструкции просты в изготовлении и обладают долговечностью и огнестойкостью.
3. Природные и искусственные камни применяют для возведения каменных зданий и сооружений.
4. В качестве природных каменных материалов применяют известняк, песчаник и граниты, из которых возводят фундаменты и стены.
5. Песчаник используют для бетонного заполнителя.
6. Когда и где камень стали использовать в строительстве?
7. Знаменитые египетские пирамиды - памятники строительному искусству.
8. Римское каменное строительство превзошло постройки греков.
9. Сухая кладка – это самая ранняя форма каменного строительства.
10. Гранит – это магматическая горная порода.

XI. Put all possible questions to the sentences.

1. The famous Egyptian Pyramids built 5,000 years ago remain monuments to engineering rather than architecture.

2. The Roman stone-building covered a wider range of uses than those of the Greeks.

3. The Egyptians used stones in two ways: 1) for external walls of houses and 2) for Temples and Palaces.

XII. Answer the following questions.

1. What building material is the text about?

2. What is stone?

3. What are the main characteristics of stone?

4. Why were stone structures erected in classical times?

5. What did the Egyptians use stones for?

6. What method of construction was developed in Egypt?

7. What did the Roman stone-building reflect?

8. What geometric figures was the Roman architecture based on?

9. Where and why are natural stones widely used nowadays?

10. What natural stones are used for decoration?

XIII. Write a summary of the text.

XIV. Speak about stone as the oldest building material known to man.

LESSON 8

Phonetics: [ju], [ju:], [ʌ]

Grammar: Infinitive

Text: Glass. Стекло

I. Read and translate the following words into Russian:

secure, insulation, corrugated, ensure, durable, fuse, use; fusible, unit, include, unite;
future, duty, use, beautiful, student, cubic, view, institute, music;
much, function, product, public, industry, constructive, conductivity.

II. Learn the vocabulary:

glass [glɑ:s], [glæs] – стекло;

to glaze [gleɪz] – остеклять;

sodium [ˌsəʊdiəm] carbonate [ˈkɑ:bəneɪt] – карбонат натрия;

liquid ['likwid] – жидкость;
 to solidify [sə'lidifaɪ] – твердеть, затвердеть;
 to cast [kɑ:st] – отливать;
 to blow [bləʊ] – выдувать (стекло);
 flat [flæt] = sheet [ʃi:t] glass – листовое стекло;
 to roll [rəʊl] out – прокатывать;
 molten ['mɒltən] glass – расплавленное стекло;
 steel [sti:l] frame [freɪm] – стальная конструкция;
 high-rise ['haɪ ,raɪz] buildings – высотные здания;
 indispensable [,ɪndɪ'spensəbl] – совершенно необходимый;
 to suggest [sə'dʒest] – предлагать;
 hard [hɑ:d] – твердый;
 brittle ['brɪtl] – хрупкий;
 transparent [træns'pærənt] – прозрачный;
 poor [pʊə], [pɔ:] electrical conductivity [ɪ'lektrɪkl ,kɒndʌk'tɪvəti] – низкая электропроводность;
 ribbed [rɪbd] = prism ['prɪzəm] glass – рифленое стекло;
 corrugated ['kɒrəgeɪtɪd] glass – волнистое стекло;
 wire ['waɪə] glass – армированное стекло;
 tiles [taɪlz] – облицовочная плитка;
 mirror ['mɪrə] glass – зеркальное стекло;
 figured ['fɪɡəd] glass – узорчатое стекло;
 to ensure [ɪn'ʃʊə] natural ['nætʃrəl] lighting ['laɪtɪŋ] – обеспечивать естественное освещение;
 external [ɪk'stɜ:nl] walls – внешние стены;
 roofs [ru:fs] – крыши;
 double ['dʌbl] glazing ['gleɪzɪŋ] – двойное застекление;
 greenhouse ['ɡri:nhaʊs] – теплица.

III. Study the following information about the Infinitive.

Инфинитив в функции обстоятельства цели может стоять в начале или в середине предложения, на русский язык он переводится:

- 1) придаточным предложением с союзами «чтобы», «для того, чтобы»;
- 2) существительным с предлогом.

Model:

To master a foreign language one must work much.

Чтобы изучать иностранный язык надо много работать.

или

Для изучения иностранного языка надо много работать.

IV. Translate the sentences into Russian paying attention to the Infinitive.

1. To build different structures you must be a civil engineer.
2. This problem is too complex to be solved by students only.
3. Students meet to discuss common problems.
4. Engineers must create new building materials to meet needs in construction.
5. The Romans did much to make flat glass and to use it in buildings.
6. Engineers developed the principles of the steel frame to construct high-rise buildings.
7. Different kinds of glass are used to ensure natural lighting.
8. To provide better insulation in buildings double glazing was recommended.
9. In order to break wire glass a great amount of force must be applied.
10. To reinforce materials specialists use artificial fibres.

V. Read and translate the text.

GLASS

One of the widely used building materials is glass. It is made by melting a mixture of sand, limestone and sodium carbonate. The molten liquid is then allowed to cool and solidify.

Glass was first used only for decoration. But later when it was realized that glass could be cast or blown into shapes, the Romans did much to make a flat glass to use in buildings.

They made it by rolling out molten glass onto a hard flat table. Modern sheet glass was made in the 19th century in the United States.

At the turn of the century engineers were developing the principles of the steel frame for construction which made high-rise buildings possible. Since that time glass has become indispensable in all types of construction.

In 1919 Mies van der Roer suggested that glass to be used over the entire facades. But it took several decades for architects to realize this type of design.

At normal temperature glass is a hard, brittle, transparent substance, water- and air-resistant with poor electrical conductivity. There are different kinds of glass: constructive and architectural-decorative glass. The first group includes sheet glass used for doors, windows and also glass products: glass plates and glass bricks. Ribbed or prism glass is used on the roofs of public buildings. Corrugated glass is preferable for industrial structures. Where strength is required, wire glass is employed.

Architectural-decorative glass includes tiles, coloured-decorative glass, mirror and figured glass.

The function of glass is to ensure natural lighting.

Glass is widely used in construction, practically in every building:

- a) for structural elements: external walls, doors, windows, roofs;
- b) for better insulation of buildings by means of double glazing;

- c) for solar collectors and greenhouse glazing;
- d) for decoration.

Glass is one of the most valuable materials of our day and of the future. Glass is a unique and eco-friendly building material in the contemporary world.

VI. Match the Russian equivalents to the English terms:

- | | |
|-----------------------------------|--|
| 1) structural elements | a) стальная конструкция |
| 2) modern sheet glass | b) двойное остекление |
| 3) poor electrical conductivity | c) при нормальной температуре |
| 4) steel frame | d) армированное стекло |
| 5) architectural-decorative glass | e) обеспечивать естественное освещение |
| 6) public buildings | f) современное листовое стекло |
| 7) wire glass | g) строительные элементы |
| 8) to ensure natural lighting | h) общественные здания |
| 9) double glazing | i) архитектурно-декоративное стекло |
| 10) at normal temperature | j) низкая электропроводность |

VII. Fill in the correct prepositions and translate the sentences into Russian.

1. One ... the widely used building materials is glass.
2. Glass is made melting a mixture sand, limestone and sodium carbonate.
3. The Romans did much make a flat glass use buildings.
4. ... the turn ... the century engineers were developing the principles ... the steel frame ... construction.
5. It took several decades ... architects ... realize this type ... design.
6. ... normal temperature glass is a hard, brittle, transparent substance, air- and water-resistant ... poor electrical conductivity.
7. The function ... glass is ... ensure natural lighting.
8. Glass is used practically ... every building ... structural elements.
9. Ribbed or prism glass is used ... the roofs ... public buildings.
10. There are different kinds ... glass.

VIII. Translate the sentences into English.

1. В 1919 году архитекторы предложили использовать стекло по всему фасаду зданий.
2. Стекло получают, сплавляя смесь песка, карбоната натрия и известняка.
3. Одним из широко используемых строительных материалов является стекло.
4. Стекло – уникальный строительный материал.
5. Функция стекла – обеспечивать естественное освещение.

6. Стекло является водо- и воздухонепроницаемым материалом.
7. Какими свойствами обладает стекло?
8. На рубеже 19-20 столетий инженеры разрабатывали стальные конструкции для возведения высотных зданий из стали и стекла.
9. При нормальной температуре стекло – твердое, хрупкое, прозрачное вещество, водо- и воздухонепроницаемое с низкой электропроводностью.
10. С 19-го века стекло стало незаменимым материалом во всех видах строительства.
11. Там, где нужна прочность, используют специальное армированное стекло.
12. Современное листовое стекло было изготовлено в 19-том веке в США.
13. В каких видах строительства используют стекло?
14. Почему стекло является уникальным строительным материалом во многих странах?
15. В сочетании с какими материалами используется стекло?

IX. Learn the dialogue.

A – Do you agree that glass is no longer a fragile material of limited utility?

B – Certainly, our scientists have created "wonder glass" heat-resistant glass, for example, or a lead-oxide glass which is almost as heavy as steel.

A – What is the strongest and toughest form of glass?

B – For all I know, fibreglass is.

A – Where is fibreglass used?

B – Well, fibreglass is now used in various products for electrical and building insulation, for car-bodies.

X. Answer the following questions.

1. What building material is the text about?
2. What is glass?
3. How is glass made?
4. What properties does glass have?
5. When was glass used for high-rise buildings?
6. What kinds of glass do you know?
7. What is constructive glass?
8. What does architectural-decorative glass include?
9. What is the function of glass?
10. What makes glass a unique material?

XI. Write a summary of the text.

XII. Speak about glass as a unique building material. Make use of the key word combinations and expressions.

Artificial building material, widely used, important properties, constructive glass, architectural-decorative glass, their examples, to ensure natural lighting, external walls, doors, windows, one of the most valuable materials.

1. The information is about... – Информация о ...
2. As everybody knows... – Как известно, ...
3. As for me, I think... – Что касается меня, я полагаю ...
4. It would be interesting to note... – Было бы интересно отметить ...
5. The key feature of... is... – Отличительной чертой ... является ...
6. We must conclude that... – Подводя итог, отметим ...
7. It is necessary to add... – Необходимо добавить ...

LESSON 9

Phonetics: Compare the words and their meanings

Grammar: Participle II

Text: Timber. Древесина

I. Compare the words and their meanings:

cold ≠ called; rich ≠ reach; price ≠ prize; shall ≠ shell; very ≠ vary; wide ≠ white; worse ≠ worth; us ≠ use, pain ≠ paint, march ≠ match, wing ≠ wink.

II. Learn the vocabulary:

timber ['tɪmbə] – строевой лес, древесина;

renewable [rɪ'nju:əbl] – возобновляемый;

to exert [ɪg'zɜ:t] – оказывать влияние;

environment [ɪn'vaɪrənmənt] – окружающая среда;

to derive from [dɪ'raɪv] – происходить от;

comparison [kəm'pærɪsn] – сравнение;

low [ləʊ] volume ['vɒljʊ:m] weight [weɪt] – малый объемный вес;

thermal ['θɜ:ml] conductivity [,kɒndʌk'tɪvətɪ] – теплопроводность;

easiness ['i:zɪnəs] of treatment ['tri:tmənt] – легкость обработки;

simplicity [sɪm'plɪsɪti] – простота;

jointing ['dʒɔɪntɪŋ] – соединение;

frost [frɒst] resistance [rɪ'zɪstəns] – морозостойкость;

absorption [əb'zɔ:pʃn] – поглощение;

moisture ['mɔɪstʃə] – влага;

swelling ['swelɪŋ] – разбухание;

liability [ˌlaɪə'bɪlɪti] – подверженность;

rot [rɒt] – гниение;

to decrease [dɪ'kri:s] – уменьшать;

seasoning ['si:zənɪŋ] – сушка;
 pine [paɪn] – сосна;
 spruce [spru:s] – ель;
 oak [əʊk] – дуб;
 beech [bi:tʃ] – бук;
 larch [lɑ:tʃ] – лиственница;
 cedar ['si:də] – кедр;
 walnut ['wɔ:lɒt] – ореховое дерево;
 hardwoods ['hɑ:dwudz] – твердая древесина;
 broadleaved ['brɔ:dlɪ:vɔd] trees – лиственные породы древесины;
 softwoods ['sɒftwudz] – мягкая древесина;
 conifers ['kɒnɪfəz] – хвойные породы древесины;
 exception [ɪk'sepʃn] – исключение;
 alder ['ɔ:ldə] – ольха;
 semi-hardwood ['semi] – полутвердая древесина;
 beam [bi:m] – балка;
 engineered [ˌendʒɪ'niəd] wood [wʊd] – инженерная древесина;
 veneer [və'niə] – шпон;
 veneer [və'niə] door [dɔ:] – шпонированная дверь;
 veneer [və'niə] furniture ['fɜ:nɪʃə] – шпонированная мебель;
 plywood ['plaiwʊd] – фанера;
 medium ['mi:diəm]-density ['densɪti] fibreboard ['faɪbəbɔ:d] (MDF) –
 древесноволокнистая плита средней плотности (МДФ);
 particle board ['pɑ:tɪkl,bɔ:d] / chipboard ['tʃɪpbɔ:d] – древесно-стружечная плита
 (ДСтП или ДСП);
 glued [glu:d] laminated ['læmɪneɪtɪd] timber ['tɪmbə] (glulam) – клееный брус;
 cross-laminated timber (CLT) – многослойные клееные деревянные панели;
 skyscraper ['skaɪskreɪpə] – небоскреб;
 plyscraper ['plaɪskreɪpə] – небоскреб из фанеры;
 fire-resistant ['faɪəri,zɪstənt] – огнестойкий;
 unique [ju'ni:k] – уникальный.

III. Study the information about Participle II.

Причастие прошедшего времени (3-я форма глагола) в функции определения может стоять:

а) перед определяемым существительным. На русский язык переводится причастием прошедшего времени.

Glued timber products are widely used in construction.

Склеенные деревянные изделия широко используются в строительстве.

b) после определяемого существительного. Переводится на русский язык: причастием или придаточным определительным предложением.

Pine beams *used* in house construction are of high quality.

Сосновые балки, *использованные* в строительстве дома, – высокого качества.

ИЛИ

Сосновые балки, *которые использованы* в строительстве дома, высокого качества.

IV. Read and translate into Russian the following word combinations with timber.

Example: 1) harvested timber – заготовленная древесина

Example: 1) timber used for veneer internal doors – древесина, использованная для шпонированных межкомнатных дверей.

1) harvested 2) dried 3) classified 4) converted 5) used 6) treated 7) stress-graded 8) seasoned 9) dressed 10) laminated 11) certified	timber	1) used for veneer internal doors 2) used in construction 3) treated by chemicals 4) called the best for flooring 5) dried in the sun 6) cut with a circular saw 7) heated in a kiln 8) sawn into logs 9) decreased in size 10) classified into softwoods and hardwoods 11) tested for strengths and weaknesses
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V. Translate the sentences into Russian paying attention to Participle II.

1. Wood is the most ancient structural material known to a man.
2. Timber is a name given to the cut material derived from trees.
3. There are different kinds of timber used in construction.
4. Timber treated by chemicals becomes rot- and fire-resistant.
5. Houses built of timber are good for human health.
6. The purlin made of timber rests on the bearing construction.
7. Timber valued for positive properties has also disadvantages.
8. Results recently published on timber finishes confirm the picture in general.
9. English elm is an excellent flooring timber used for floors in factories and buildings.
10. Practical timber protection is a serious unsolved problem.

VI. Read and translate the text.

TIMBER

Timber is one of the most important natural building materials. It is renewable and trees have always exerted significant effects on people and the environment. Timber is a name given to the cut material derived from trees. In comparison with metal timber is lighter, cheaper and easier to work. Timber has many valuable properties for construction. Its positive properties are: 1) strength in combination with low volume weight; 2) the easiness of treatment; 3) the simplicity of jointing; 4) low thermal conductivity; 5) high frost resistance. Its negative properties are: 1) absorption of moisture from the air and rapid swelling; 2) liability to rot and fire; 3) inner defects.

To decrease moisture timber is dried. This process is called seasoning. There are: a) natural seasoning when timber is dried under natural atmospheric conditions; b) kiln seasoning when timber is artificially heated; c) chemical seasoning when timber is treated by special chemicals.

There are different kinds of trees. But the most preferable for construction are pine, spruce, oak, beech, larch, cedar, and walnut.

Timber construction is traditional in many countries: Great Britain, Canada, Korea, Brazil, China, Japan. Wooden structures were also favoured in ancient Russia. Timber is usually classified into hardwoods - broadleaved trees, and softwoods - conifers. However, there are a few exceptions. Some softwoods can be hard and some hardwoods can be soft. Alder, for example, is known as a semi-hardwood because its wood is one of the softest of all hardwoods. About 80% of all timber used in the world comes from softwoods because they grow faster than hardwoods.

Timber is widely used in all types of construction:

- 1) for structural elements: beams, floors, doors, windows, and roofs;
- 2) for engineered wood: veneer (veneer doors and veneer furniture), plywood, medium-density fibreboard (MDF), particle board (often called chipboard), glued laminated timber (glulam) and cross-laminated timber (CLT);
- 3) for decoration.

What is more, timber is becoming increasingly popular in the construction of high-rise buildings. It is used for building plywood skyscrapers, known as plyscrapers. Wooden skyscrapers are built of CLT (cross-laminated timber), which is fire-resistant.

Timber is a unique and eco-friendly building material in modern construction.

VII. Fill in the correct prepositions and translate the sentences into Russian.

1. Timber is one ... the most important natural building materials.
2. Trees have always exerted significant effects ... people and the environment
3. ... comparison ... metal timber is lighter, cheaper and easier ... work.
4. Its positive properties are strength ... combination ... low volume weight, the easiness ... treatment, the simplicity ... jointing.
5. Its negative properties lower the constructive value ... timber.
6. Special chemical treatment makes timber resistant ... rot and fire.

7. There are different methods ... seasoning timber.
8. Seasoning naturally ... the open air or ... kilns presents no special problems.
9. Timber ... different districts varies ... hardness and this peculiarity impacts ... the working qualities.
10. Glulam beams offer high resistance ... fire.

VIII. Memorize the following synonyms:

unit = element = member;
 aim = purpose;
 bearing = supporting;
 trained = skillful;
 to fulfil = to carry out.

to place in position = to put in place;
 artificial = man-made;
 to get = to obtain;
 timber = wood;
 different = various.

IX. Fill in the gaps with the *comparative* or *superlative* form of the adjectives/adverbs in brackets and translate the sentences into Russian.

1. Softwoods are ... (cheap) than hardwoods.
2. Hardwoods are ... (expensive) than softwoods.
3. Softwoods grow ... (fast) than hardwoods.
4. Some hardwoods (e.g. balsa) are ... (soft) than most softwoods, while the ... (hard) hardwoods are much ... (hard) than any softwood.
5. Weeping willow is one of the ... (fast) growing shade trees.
6. Alder is one of the ... (soft) of all hardwoods.
7. Hardwoods are usually ... (dense) than softwoods.
8. Hardwoods grow ... (slowly) than softwoods.
9. Hardwoods last ... (long) than softwoods.
10. In the long term, hardwoods can be ... (cost-effective) option than softwoods.

X. Translate the sentences into English.

1. Древесина – природный строительный материал.
2. Древесина легко обрабатывается.
3. Древесина – удобный материал для изготовления сборных конструкций.
4. Дуб – одна из старейших пород, использующихся для изготовления мебели.
5. Деревья всегда оказывали положительный эффект на людей и окружающую среду.
6. У древесины много свойств, ценных для строительства.
7. Специальная химическая обработка практически устраняет недостатки древесины.
8. Имеются три вида сушки древесины: 1) природная, 2) искусственная и 3) химическая обработка.

9. Какие виды древесины наиболее востребованы в строительстве?
10. Как можно классифицировать древесину?

XI. Answer the following questions.

1. What building material is the text about?
2. What is timber?
3. What positive properties does timber have?
4. What negative properties does timber have?
5. Speak about seasoning.
6. Can you give examples of trees? Which of them are preferable for construction?
7. Why is timber construction traditional in many countries?
8. How is timber usually classified?
9. What is timber used in construction for?
10. Why is timber a unique building material?

XII. Write a summary of the text.

XIII. Speak about timber as an important natural and renewable building material. Make use of the key word combinations and expressions.

Renewable building material, valuable properties, seasoning of timber, preferable kinds, traditional timber construction, hardwoods and softwoods, bearing elements, engineered wood, unique and eco-friendly building material.

1. I'm going to speak about... – Я собираюсь рассказать о...
2. I'll start by saying that... – Начну с того, что...
3. It is generally agreed that... – Общепринято, что...
4. It is important to stress... – Важно подчеркнуть...

LESSON 10

Phonetics: Compare the words and their meanings

Grammar: Participle I

Text: Plastics. Пластмасса

I. Read the following words and translate them into Russian:

plastics ≠ plastic ≠ plastering;
 wall ≠ well ≠ will;
 plan ≠ plane ≠ plain;
 resin ≠ rubber;
 hotel ≠ hostel;

offer ≠ off;
 colour ≠ column;
 synthetic ≠ scientific
 date ≠ data;
 theme ≠ them;

retain ≠ restore;
 property ≠ produce;
 modify ≠ mould;
 by ≠ buy;
 form ≠ from.

II. Learn the vocabulary:

plastics [ˈplæstɪks] – пластмасса, синтетические материалы;
discovery [dɪˈskʌvəri] – открытие;
to retain [rɪˈteɪn] – сохранять;
to contain [kənˈteɪn] – содержать;
synthetic [sɪnˈθetɪk] resin [ˈrezɪn] – искусственная смола;
celluloid [ˈseljʊləɪd] – целлулоид;
to mould [məʊld] – формовать;
rigid [ˈrɪdʒɪd] – жесткий;
impenetrable [ɪmˈpenɪtrəbl̩] – непроницаемый;
flexible [ˈfleksɪbl̩] – гибкий;
to derive from [dɪˈraɪv] – происходить от;
thermosoftening [ˈθɜːməʊ, ˈsɒfnɪŋ] plastic [ˈplæstɪk] – термопластичный пластик;
thermosetting [ˈθɜːməʊ, ˌsetɪŋ] plastic [ˈplæstɪk] – термореактивный пластик;
thermoplastics [ˈθɜːməʊ, plæstɪks] – термопласты;
to soften [ˈsɒfn̩] – размягчать(ся), смягчать(ся), становиться мягким;
therefore [ˈðeəfɔː] – следовательно, поэтому;
to reshape [ˌrɪːˈʃeɪp] – придавать новый вид или иную форму;
thermoset [ˈθɜːməʊ, set] – термореактопласт;
engineering plastics [ˌendʒɪˈnɪərɪŋ ˈplæstɪks] – инженерные пластики;
polyvinyl chloride (PVC) [ˌpɒlɪˈvaɪnɪl ˈklɔːraɪd] – поливинилхлорид (ПВХ);
polycarbonate (PC) [ˌpɒlɪˈkɑːbənət] – поликарбонат;
plasticizer [ˈplæstɪ, saɪzə] – пластификатор;
to distinguish [dɪˈstɪŋgwɪʃ] – различать;
behaviour [bɪˈheɪvjə] – поведение;
fibrous material [ˈfaɪbrəs məˈtɪəriəl] – волокнистый материал;
to replace [rɪˈpleɪs] – заменять;
stretch [stretʃ] ceiling [ˈsiːlɪŋ] – натяжной потолок;
plumbing [ˈplʌmɪŋ] – водопровод;
electrical [ɪˈlektrɪkl̩] insulation [ˌɪnsjuːˈleɪʃn̩] tape [teɪp] – электрическая изоляционная лента;
imitation [ˌɪmɪˈteɪʃn̩] leather [ˈleðə] upholstery [ˌʌpˈhəʊlstəri] – искусственная кожа для обивки мебели;
covering [ˈkʌvərɪŋ] – покрытие;
wallpaper [ˈwɔːlpeɪpə] – обои;
opportunity [ˌɒpəˈtjuːnəti] – возможность;
to offer [ˈɒfə] – предлагать;
to create [kriˈeɪt] – создавать.

III. Study the information about Participle I.

Model: *Verb + ing = Participle I (глагол + ing окончание = Причастие I)*

to speak (говорить) – speaking (говорящий)

Причастие настоящего времени в функции определения может находиться:

a) перед определяемым словом:

a *moving* object – *движущийся* предмет;

the *boiling* water changes into steam – *кипящая* вода превращается в пар;

b) после определяемого слова:

the workers *building* a new house – рабочие, *строящие* новый дом;

the water *boiling* in the vessel changes into steam – вода, *кипящая* в сосуде, превращается в пар.

На русский язык переводится причастием действительного залога с суффиксами *-ущ, -ющ, -ащ, -ящ, -вш, -ш, -щий*.

IV. Form Participle I from the following verbs and translate them into Russian.

Model: to work – working – while working; работать – работающий – работая

to build, to involve, to break, to use, to apply, to take part, to design, to decrease, to develop, to mix, to distinguish, to prove, to make, to obtain, to equip, to employ, to replace.

V. Translate the following word combinations into Russian:

a) *причастие перед словом:*

using new methods of construction;

receiving important information;

graduating from the University;

discovering new lands;

achieving good results.

b) *причастие после слова:*

the student carrying out the research;

the engineer using a new method;

the company building houses;

the workers mixing the raw materials;

the man achieving good results.

VI. Translate the sentences into Russian paying attention to Participle I.

1. Plastics are artificial materials resulting from scientific discoveries.

2. They contain synthetic resin forming high molecular substances.

3. We use the word plastic meaning «capable of being moulded».

4. Plastics combine all the fine characteristics of a building material having good insulating properties.

5. Vinyl floor tiles requiring no polishing have remarkable hard wearing properties.

6. Being rigid and low flammable, polyvinyl chloride is widely used for pipes, door frames, and window frames.

7. Plastic pipes withstanding normal industrial and domestic waste do not suffer from corrosion.

8. Plastics having advantages over natural materials are of great importance today.

9. Using new methods, scientists developed hard wearing plastics.

10. Being strong and transparent, polycarbonates are widely used for greenhouse and balcony glazing, roof lights, eyewear and food storage containers.

VII. Read and translate the text.

PLASTICS

Plastics are the most important materials resulting from scientific discoveries. They retain the plastic properties at definite stages of their production and contain synthetic resin, forming high molecular substances. The word plastic is a general name for a group of materials meaning "capable of being moulded". The plastics industry dates perhaps from 1870 with the initial production of celluloid.

There are now hundreds of different plastics, each with its own particular properties. Some plastics are hard, rigid and quite impenetrable by light even when they are very thin. Others are flexible as celluloid even more transparent and yet extremely hard. But all of them were developed by scientists from chemicals derived from coal, petroleum, water and air.

By alloying, modifying and changing the structure of polymers technologists produce different kinds of plastics. There are two basic groups of plastics: thermosoftening and thermosetting plastics distinguished by their behaviour when heated. While thermosoftening plastics (also known as thermoplastics) soften when heated and therefore can be reshaped, thermosetting plastics, or thermosets, do not soften on heating. Engineering plastics are mostly thermoplastics such as polyvinyl chloride (PVC) and polycarbonate (PC). PVC can be rigid or flexible. It is made more flexible by adding plasticizers.

Today plastics are of great importance because they offer a unique combination of properties valuable for construction. They are: small unit weight, great mechanical strength, durability, good insulating properties, variety of colours, resistance to corrosion and chemicals.

Plastics can be reinforced by fibrous materials such as glass fibre, nylon. Plastics are suitable for many purposes. In some cases they replace metal and glass. Polycarbonate, for example, is used for greenhouse and balcony glazing. The rigid form of PVC has wide application in construction as pipes, door frames, and window frames. The flexible form of PVC is used for flooring, stretch ceilings, plumbing, electrical insulation tapes, and imitation leather upholstery.

Besides, plastics are good as coverings for walls instead of usual wallpaper in schools, hotels and offices and decoration of kitchens and bathrooms.

Plastics give people the opportunity to create warmth, colour and variety. A great future is open for plastics.

VIII. Fill in the correct prepositions and translate the sentences into Russian.

1. Plastics are the most important materials resulting ... scientific discoveries.
2. They retain the plastic properties ... definite stages ... their production.
3. The plastics industry dates ... 1870 ... the initial production ... celluloid.
4. ... alloying, modifying and changing the structure ... polymers technologists produce different kinds ... plastics.
5. Scientists developed plastics ... chemicals derived ... coal, water, air and petroleum.
6. There are two basic groups ... plastics.
7. Plastics are ... great importance ... they offer a unique combination ... properties valuable ... construction.
8. Vinyl floor tiles are easy ... lay ... any surface.
9. Plastics have many advantages ... natural materials.
10. Coverings ... walls and ceilings are made ... plastics ... usual wallpaper.

IX. Translate the sentences into English.

1. Пластмасса обладает уникальным сочетанием свойств, ценных для строительства.
2. Синтетические материалы используют не только как отделочные, но и как строительные материалы.
3. Производство пластмассы не зависит от природных сырьевых материалов.
4. Пластики пригодны для массового производства.
5. Некоторые пластики прозрачны и легко склеиваются, прессуются и штампуются.
6. Благодаря цветовой гамме, пластики помогают людям создавать уют.
7. Пластмасса имеет много преимуществ над природными материалами.
8. Термопластик – это материал, который при нагревании размягчается и становится тягучим.
9. Терморезистивный пластик при нагревании превращается в твердый, неплавкий материал.
10. В сочетании с какими материалами используют пластмассу в строительстве?

X. Answer the following questions.

1. What building material is the text about?

2. What are plastics?
3. What properties do plastics retain?
4. What was the earliest form of plastics?
5. What are the basic groups of plastics?
6. What is the difference between thermosoftening and thermosetting plastics?

Are engineering plastics thermosets or thermoplastics?

7. Why are plastics of great importance today?
8. What properties do plastics have?
9. What are the advantages of plastics?
10. Where would you like to use plastics in construction?

XI. Write a summary of the text.

XII. Speak about plastics as decorative materials in construction. Make use of the key words and expressions.

Artificial material, scientific discoveries, synthetic resin, a unique combination of properties, can be reinforced, replace metal and glass, coverings for walls, the opportunity to create warmth and variety, decorative materials, plastics are good as, a great future is open for.

The text is about... – В тексте идет речь о ...

To my mind... - На мой взгляд ...

I'm quite sure that... – Я совершенно уверен, что ...

It should be mentioned that... – Следует упомянуть, что ...

The key feature of...is... – Отличительной чертой...является ...

Finally it can be observed... – В заключении можно отметить ...

Summarizing the above... – Резюмируя вышесказанное ...

LESSON 11

Phonetics: Compare the words and their meanings

Grammar: Active and Passive

Text: Bioconcrete. Биобетон

I. Compare the vocabulary:

envelop ≠ envelope; principal ≠ principle; accept ≠ except; conscience ≠ conscious; desert ≠ dessert; beside ≠ besides; lose ≠ loose; stationary ≠ stationery; cook ≠ cooker, current ≠ currant, effective ≠ efficient, personal ≠ personnel; quite ≠ quiet; fair ≠ fare; dairy ≠ diary.

II. Learn the vocabulary:

to consume [kən'sju:m] – потреблять, расходовать;
to pave [peɪv] – мостить, бетонировать;
to span [spæn] – строить мост, перекрывать пролет (например, моста), перекидывать (например, мост);
to source [sɔ:s] – получать;
heat-resistant [hi:tri'zɪstənt] – жаростойкий, термостойкий;
on a large scale [skeɪl] – в крупных масштабах;
to suffer ['sʌfə] – страдать;
flaw [flɔ:] – изъян, недостаток;
tiny ['taɪni] – крошечный;
crack [kræk] – трещина;
tension ['tenʃn] – напряжение;
to seep [si:p] – протекать, проникать, просачиваться;
to damage verb, damage noun ['dæmɪdʒ] – повреждать, повреждение, поломка;
reinforcement [ri:ɪn'fɔ:smənt] – арматура;
repair [rɪ'reə] – ремонт;
time-consuming ['taɪmkən, sju:mɪŋ] – отнимающий много времени, связанный с тратой времени; трудоёмкий (о работе, занятии и т. п.);
solution [sə'lu:ʃn] – решение;
age-old [eɪdʒ 'əʊld] – вековой, старый;
to seal [si:l] – плотно закрывать, запечатывать;
embedded [ɪm'bedɪd] – вставленный, встроенный, вкрапленный;
bacteria [bæk'tɪəriə] – бактерии, множественное число, единственное число – bacterium (бактерия);
calcium [kælsiəm] lactate ['lækteɪt] – лактат кальция;
nitrogen ['naɪtrədʒən] – азот;
phosphorus ['fɒsfərəs] – фосфор;
to germinate ['dʒɜ:mɪneɪt] – прорасти;
calcium [kælsiəm] carbonate ['kɑ:bəneɪt] – карбонат кальция;
to be intended [ɪn'tendɪd] – предназначаться;
to decrease [di'kri:s] – уменьшать, сокращать;
city officials [ə'fɪʃl] – городские власти;
pothole ['pɒθəʊl] – рытвина, яма (на дороге);
to mend [mend] – ремонтировать, чинить.

III. Put the verbs in brackets into the correct active or passive form.

A. The challenge of determining stresses within various sections of the Pantheon has always excited both architects and engineers who (interest) in the building. Technical design people (to recognise) that the long 143 foot span of the ancient

dome (can have) critical stress concentrations leading to a catastrophic failure of the structure, but this (not/ to happen).

Nothing in life (seem) perfect, and this is the case with the Pantheon. The dome and walls (crack). It is known that concrete (crack) under excessive tensile stress. A. Terenzio, an Italian superintendent of monuments, (document) cracking in the walls and dome during his inspection of the Pantheon in 1930.

B. The principles of producing concrete and understanding the laws of concrete behavior are well enough established through long experience and extensive research to make it possible to design and erect structures that meet the recognized requirements of engineering use and safety. There is still a need for continued research, however. New questions constantly (arise), and new methods and machines for construction operations (develop). If concrete is to meet increasingly higher expectations with regard to durability and structural efficiency, and continue in the forefront as a building material, the new requirements need (meet) by ever-increasing knowledge obtained from research and experience.

IV. Translate the sentences into English.

1. Вчера я попросил преподавателя помочь мне.
2. Вчера меня попросили помочь его брату.
3. Прошлым летом я научил приятеля кататься на роликах.
4. Я посоветовал коллеге поискать эту информацию в Интернете.
5. Мне посоветовали обратиться к вам.
6. Я сдал отчет вовремя.
7. Они сдали вещи на хранение.
8. Руководство проектом поручено мне.
9. Ее не будет до вечера.
10. Результаты исследования обрабатываются на компьютере.

V. Match the English and Russian equivalents.

- | | |
|-----------------------------|--|
| 1. steel reinforcement | a. встроенные частицы |
| 2. tiny cracks | b. самовосстанавливающийся бетон |
| 3. embedded particles | c. стальная арматура |
| 4. within a matter of weeks | d. обычный бетон |
| 5. concrete mortar | e. расходы на техническое обслуживание |
| 6. serious flaw | f. ремонт несущих конструкций зданий |
| 7. self-healing concrete | g. за считанные недели |
| 8. maintenance costs | h. серьезный недостаток |
| 9. structural repair | i. крошечные трещины |
| 10. conventional concrete | j. бетонный раствор |

VI. Read and translate the text.

BIOCONCRETE



Fig. 2. Self-healing concrete

Concrete is the most widely produced and consumed material on earth except for water. It constructs our buildings, paves our roads and spans our bridges. It is highly unlikely that another building material will replace concrete on a large scale in the near future because it is durable and heat-resistant. What is more, the raw materials for concrete are easily sourced. However, concrete suffers from a serious flaw. It develops tiny cracks within a matter of weeks when under tension. They allow water to seep into the structure. As a result, water damages the concrete as well as the building's steel reinforcement. Besides being expensive, repairs using concrete mortar are time-consuming.

But there is a solution to this age-old problem. Dutch microbiologist Henk Jonkers from the Delft University of Technology invented the bioconcrete of the future, which seals its own cracks. His self-healing concrete has embedded particles containing bacteria, calcium lactate, nitrogen and phosphorus. Bacteria can sleep in the concrete for centuries. But if water seeps into the cracks, it awakens the bacteria. Then their spores start to germinate and feed on the calcium lactate. The bacteria convert the calcium lactate into calcium carbonate (limestone). Being the main ingredient of cement, limestone fills the cracks.

The main advantage of bioconcrete is that it is more environmentally friendly than conventional concrete. Self-healing concrete is intended to decrease the production of new concrete, which is harmful to the environment. Also, bioconcrete can reduce maintenance costs for city officials, home and building owners.

However, self-healing concrete is more expensive than traditional one. Moreover, bioconcrete can't heal very wide cracks and potholes on roads just yet. Currently, the technology is capable of mending cracks up to 0.8 mm wide.

There are three forms of the invention: a spray that can be applied to existing buildings for small cracks that need repairing, a repair mortar for structural repair of huge damage and self-healing concrete itself.

In 2021 self-healing concrete went on sale in the UK.

VII. Decide whether the sentences below are true or false. Then, change one word in each of the false sentences to correct them.

1. Concrete develops large cracks within a matter of weeks when under tension.
2. Repairs using concrete mortar are inexpensive.
3. Water seeps into the cracks and damages the concrete as well as the building's steel reinforcement.
4. Concrete is a durable and heat-resistant building material.
5. The bacteria convert the calcium lactate into sandstone.
6. Bioconcrete will increase the production of new concrete.
7. Conventional concrete is costlier than biological one.
8. Self-healing concrete can't cure very wide cracks.
9. A repair spray for structural repair of huge damage represents one of the three forms of the invention.
10. Bioconcrete can reduce maintenance costs for city officials, home and building owners.

VIII. Fill in the correct prepositions and translate the sentences into Russian.

1. Concrete suffers ... a serious flaw.
2. It is highly unlikely that another building material will replace concrete ... a large scale ... the near future.
3. Tiny cracks allow water seep ... the structure, damaging both the concrete and the building's steel reinforcement.
4. There is a solution ... the problem ... cracks ... concrete.
5. Bacteria can sleep ... the concrete ... centuries.
6. Self-healing concrete has the ability ... repair itself ... tensile forces.
7. The spores ... the bacteria feed ... the calcium lactate.
8. Bioconcrete is designed ... decrease the amount ... new concrete produced.
9. There are three forms ... the invention.
10. ... 2021 self-healing concrete went ... sale ... the UK.

IX. Rewrite the sentences in the passive.

1. Another building material will not replace concrete on a large scale in the near future.
2. What concrete did Dutch microbiologist Henk Jonkers invent?
3. Water damages the concrete.
4. The bacteria convert the calcium lactate into limestone.
5. Bioconcrete can reduce maintenance costs for city officials, home and building owners.
6. Water awakens the bacteria.
7. Academics from the Universities of Bath and Cambridge are testing different self-healing techniques at the site.
8. Bioconcrete can't heal very wide cracks and potholes on roads.
9. Dutch microbiologist Henk Jonkers found a solution to the problem of cracks in concrete.
10. Chemical additives can also seal cracks in concrete, but they make concrete more brittle.

X. Translate the sentences into English.

1. Бетон – это самый потребляемый материал в мире, не считая воды.
2. Маловероятно, что другой строительный материал заменит бетон в ближайшем будущем, поскольку бетон обладает многими полезными для строительства свойствами.
3. Основным недостатком бетона является то, что в течение нескольких недель под напряжением в нем появляются трещины.
4. Ремонтные работы с использованием бетонного раствора дорогие и отнимают много времени.
5. Сегодня существует решение проблемы трещин в бетоне.
6. Микробиолог из Нидерландов Хенк Йонкерс изобрел биологический бетон.
7. Самовосстанавливающийся бетон имеет встроенные частицы, содержащие бактерии, лактат кальция, азот и фосфор.
8. Когда вода попадает в трещины в бетоне, споры бактерий начинают прорастать и питаться лактатом кальция.
9. Бактерии преобразовывают лактат кальция в известняк, который заполняет трещины в бетоне.
10. Биологический бетон может сократить расходы на техническое обслуживание для городских властей, а также владельцев жилья и застройщиков.

XI. Answer the following questions.

1. What building material is the text about?

2. Why is it highly unlikely that another building material will replace concrete on a large scale in the near future?
3. What serious flaw does concrete suffer from?
4. What concrete did Dutch microbiologist Henk Jonkers from the Delft University of Technology invent?
5. What are the special ingredients of self-healing concrete?
6. What happens to the bacteria if water seeps into the cracks?
7. How does bioconcrete heal itself?
8. Can you compare the advantages and disadvantages of bioconcrete?
9. How many forms of the invention are there? What are they?
10. Where did self-healing concrete go on sale in 2021?

XII. Write a summary of the text.

XIII. Speak about bioconcrete.

LESSON 12

Phonetics: [wɜ:], [wɔ], [h], [iə], [ʃ].

Grammar: Sequence of Tenses. Reported Speech

Text: Ceramic foams. Пенoкeрaмикa

I. Read and translate the following words into Russian:

were, word, work, worker, worse, worth, world, worm;
 want, what, wander, was, wash, dishwasher, wallet, wand, warrant, wall, watch,
 wasp;

he, home, hay, high, hike, hot, horse, hand, hook, how, his, her, honey, help, whom,
 hard, hotel, house;

near, dear, deer, here, clear, theatre, period, really, severe, appear, career, sneer, ear;
 ship, shelf, shut, fish, finish, sheep, shape, show, she, shock, shop, shy, shake, shame.

II. Recall the sequence of tenses in an English sentence:

He says (that)	{	he works (<i>is working</i>) <i>работает</i> (одновременное действие) he worked (<i>was working</i>) <i>работал</i> (предшествующее действие) he will work (will be working) <i>будет работать</i> (будущее время)
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He said (that)	{	he worked (<i>was working</i>) <i>работает</i> (одновременное действие) he had worked <i>работал</i> (предшествующее действие) he would work (would be working) <i>будет работать</i> (будущее действие)
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III. Translate the following sentences into Russian.

1. Tom says they were friends at the University.
2. I was told that you had been good at Theoretical Mechanics.
3. He added that he would take a correspondence course next year.
4. My cousin says Ann has just come back from the Altai.
5. I didn't know that she had been to the Altai.
6. They say she had a lot of sightseeing there.
7. Ann says she has taken many photographs while travelling to the Altai.
8. She says she will come to see us next Saturday.
9. She said she would bring and show us the photographs.
10. John said he was very busy in London.
11. Susan says she was staying at the Ritz Hotel on her holiday.
12. They said they were no longer interested in the discussion of that problem.

IV. Rewrite the following dialogue into narration.

Martin: Where do the trucks come from?

Foreman: They come from the cement factory.

Martin: Where is that?

Foreman: It's about ten miles from here.

Martin: Where do the workers eat their lunch?

Foreman: They eat where they work.

Martin: What's that man doing up there?

Foreman: He's putting up the forms for cement.

V. Learn the vocabulary:

ceramic [sɪ'ræmɪk] foams [fəʊmz] – пенокерамика;
consist (of) [kən'sɪst] – состоять (из);
three-dimensional [θri: d(a)ɪ'menʃənl] – трехмерный;
network of ['netwɜ:k] struts [strʌts] – сеть распорок;
combination [ˌkɒmbɪ'neɪʃn] – сочетание;
permeability [ˌpɜ:mɪə'bɪlɪtɪ] – проницаемость;
heat [hi:t] capacity [kə'pæsɪtɪ] – теплоемкость;
diverse [daɪ'vɜ:s] – различный, разнообразный;
ion-exchange ['aɪən-ɪks'tʃeɪndʒ] – ионообменный;
catalyst ['kætəlist] support [sə'pɔ:t] – поддержка катализатора;
refractory [rɪ'fræktəri] lining ['laɪnɪŋ] – огнеупорная футеровка;
soot [sʊt] – сажа;
flame [fleɪm] rectifier ['rektɪfaɪə] – клапан контроля пламени;
blowing ['bləʊɪŋ] agent ['eɪdʒənt] – вспенивающий агент;
basalt ['bæso:lt] fiber [faɪbə] – базальтовое волокно;
ground [graʊnd] glass – молотое стекло;

engineered [ˌendʒɪˈniəd] foam – строительная пена;
open cell [ˈəʊpən sel] foam – пена с открытыми ячейками;
closed cell [kləʊzd sel] foam – пена с закрытыми ячейками;
polyhedral [ˌpɒliˈhiːdrəl] – многогранный;
brittle [ˈbrɪtl] – хрупкий, непрочный;
diesel [ˈdiːzəl] engine [ˈendʒɪn] – дизельный двигатель;
interconnectivity [ˌɪntəˈkɒnekˈtɪvəti] – взаимосвязанность;
pore [pɔː] – пора.

VI. Read and translate the text.

CERAMIC FOAMS

Ceramic Foam Filter

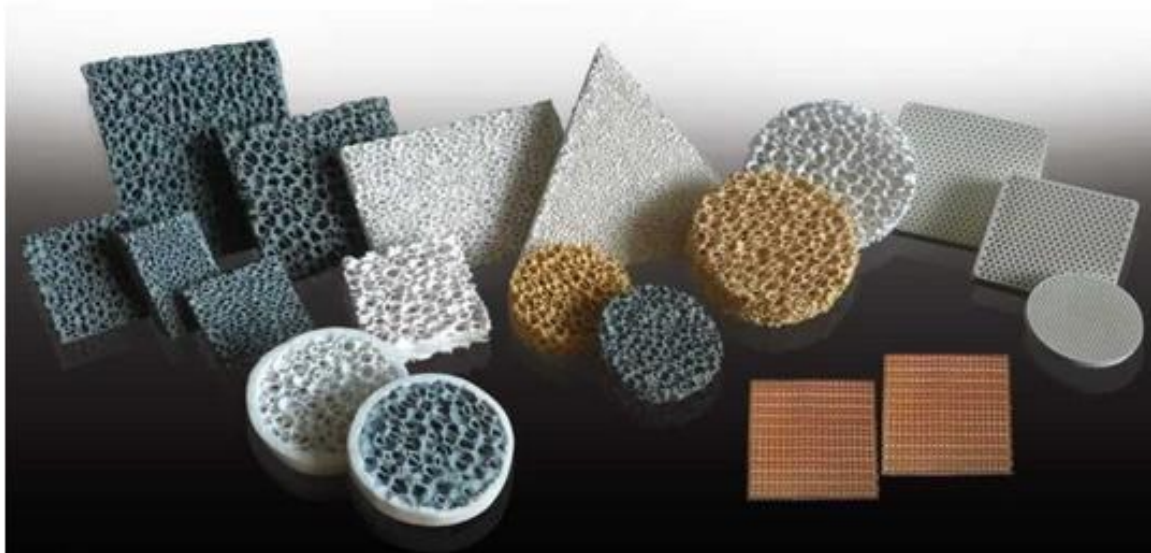


Fig. 3. Ceramic Foam Filters

Ceramic foams consist of cellular structures composed of a three-dimensional network of struts. Ceramic foams have an interesting combination of properties, such as low weight, high temperature stability, high water permeability, high porosity, low thermal conductivity and low heat capacity. These properties of ceramic foam have led to diverse fields of its application, ranging from metal melt filtration, ion-exchange filtration, heat exchangers, catalyst support, refractory linings, thermal protection systems, diesel soot traps, flame rectifiers and solar radiation collectors.

Ceramic foams are produced by mixing clay, aggregate, fiber, water and a blowing agent. Basalt fiber is used as a fiber, ground glass or fired clay and foam are used as aggregates.

Engineered foams have cellular structures, which are categorized as either open cell or closed cell foams. Foams consist of an assembly of irregularly shaped prismatic or polyhedral cells connected to each other with solid edges. Engineered foams

have been manufactured from polymers, metals, glass and ceramics. Ceramic foams are porous brittle materials with closed, fully open or partially interconnected porosity. Porous ceramic materials are being used in many industries and continue to be very active area of research.

Open cell ceramic foams are used for a very wide range of applications. The excellent thermal resistance facilitates their use for metal melt filtration and diesel engine exhaust filters. Ceramic foam filters improve molten metal casting quality by removing non metallic inclusions.

Ceramic foams have so far been produced in a variety of materials with various cell sizes, densities and degree of interconnectivity. Foams are usually produced with densities between 10 and 40% and pore sizes between 100 μm and 1 mm.

VII. Say whether the following statements are true or false.

1. Ceramic foams consist of cellular structures composed of a two-dimensional network of struts.

2. Basalt fiber is used as an aggregate.

3. Engineered foams have cellular structures, which are categorized as either open cell or closed cell foams.

4. Open cell ceramic foam manufacturing techniques can be classified into three general categories: sponge-replication, foaming agents or space holder method.

5. Foams are usually produced with densities between 10 and 40% and pore sizes between 1000 μm and 100 μm .

VIII. Translate the sentences into English.

1. Пенокерамика обладает интересным сочетанием свойств.

2. Технические пены, называемые также пеноматериалами, подразделяются на пеноматериалы с открытыми или закрытыми ячейками.

3. Пенокерамика – пористый, хрупкий материал.

4. Пенокерамика производится путем смешивания глины, заполнителя, волокна, воды и вспенивающего агента.

5. Пористые керамические материалы используются во многих отраслях промышленности.

6. Пенокерамика с открытыми ячейками имеет широкий спектр применений.

7. Превосходная термостойкость позволяет использовать пенокерамику при производстве выхлопных фильтров дизельных двигателей.

8. Пенокерамические фильтры улучшают качество отлива расплавленного металла за счет удаления неметаллических включений.

9. Пенокерамика до сих пор производится из материалов с различными размерами ячеек, плотностью и степенью взаимосвязанности.

10. Пены обычно производят с плотностью от 10 до 40% и размером пор от 100 μm до 1 мм.

IX. Match the following terms with their definitions.

ion-exchange	сажа
brittle	клапан контроля пламени
open cell foam	пóра
network of struts	теплоемкость
consist of	непрочный
polyhedral	молотое стекло
interconnectivity	многогранный
flame rectifier	огнеупорная футеровка
ground glass	дизельный двигатель
soot	ионообменный
heat capacity	сеть распорок
pore	пена с открытыми ячейками
refractory lining	состоять из
diesel engine	взаимосвязанность

X. Answer the following questions.

1. What do ceramic foams consist of?
2. What properties do ceramic foams have?
3. What have the properties of ceramic foams led to?
4. Ceramic foams are produced by mixing clay, aggregate, fiber, water and a blowing agent, aren't they?
5. Which materials are used as aggregates?
6. Do engineered foams have cellular or dense structure?
7. How are engineered foams categorized?
8. What are open cell ceramic foams used for?
9. Have ceramic foams been produced in a variety of materials?
10. What densities and pore sizes are foams usually produced?

XI. Give the summary of the text.

XII. Make up a plan of the text.

XIII. Speak about ceramic foams.

LESSON 13

Phonetics: [w], [θ], [ð]

Grammar: Perfect Active

Text: Reinforced Concrete. Железобетон

I. Read and translate the following words into Russian:

will, weight, water, wire, which, wall, widely, but whole, when, were, way;
method, strength, earthquake, thinner, north, south, nothing, birth;
together, others, further, there, weather, their, either, neither, those.

II. Learn the vocabulary:

reinforced concrete [ˌriːɪn'fɔːst] – железобетон;
compressive [kəm'presɪv] strength [streŋθ] – прочность на сжатие;
elastic properties [ɪ'læstɪk] – упругие свойства;
to introduce [ˌɪntrə'djuːs] – вводить;
reinforcement [ˌriːɪn'fɔːsmənt] – арматура;
to consist [kən'sɪst] – состоять, заключаться;
wire ['waɪə] mesh [meʃ] – проволочная сетка;
system of rods – система стержней;
performance [pə'fɔːməns] – характеристика;
to transform [træns'fɔːm] – преобразовывать;
continuity [ˌkɒntɪ'njuːəti] – непрерывность;
homogeneous [ˌhɒmə'dʒiːniəs] – однородный;
to distribute loads [dɪ'strɪbjʊ:t] – распределять нагрузки;
framework ['freɪmwɜ:k] – каркас, конструкция;
post-and-beam ['pəʊstən'bɪm] construction [kən'strʌkʃn] – каркасная конструкция;
steel-framed [ˌstiːl'freɪmd] structure ['strʌktʃə] – рамная стальная конструкция;
consideration [kən,sɪdə'reɪʃn] – рассмотрение;
assembly [ə'sembli] method ['meθəd] – метод сборки;
speed of construction [spi:d] – скорость строительства;
to determine [dɪ'tɜːmɪn] – определять;
earthquake ['zːθkweɪk] – землетрясение;
formwork ['fɔːm,wɜ:k] – опалубка;
fibreglass (US English fiberglass) ['faɪbəglɑːs], ['faɪbərglæs] – стекловолокно;
productivity [ˌprɒdʌk'tɪvəti] of labour ['leɪbə] – производительность труда;

III. Study the model and compare the following sentences in their meanings.

Model: to have + 3 форма глагола

He **has just finished** his experiment. – Он только что завершил свой опыт.

He **had finished** his experiment by 5 o'clock. – Он завершил свой опыт к 5 часам.

He **will have finished** his experiment by the end of this week. – Он завершит свой опыт к концу этой недели.

1. He entered the University last year.

He has entered the University this year and is proud of being a student now.

2. I did not see him in May.

I have not seen him since May.

3. The workers will build this new house.

The workers will have built this new house by the beginning of the new year.

4. They applied new methods in their research.

They had already applied new methods in their research and got surprising results.

5. Did you pass your exams in winter? Have you passed your exam? With what results?

IV. Read and translate the text.

REINFORCED CONCRETE

Reinforced concrete is a combination of two materials: steel and concrete. It is strong, durable, heavyweight with high compressive strength and good elastic properties, air-, water-, gas-, heat-, fire-, and corrosion-resistant.

To introduce steel into concrete the method of reinforcement is generally used. It consists in putting a wire mesh or a system of rods into the concrete in definite proportions. Specialists have to calculate the quantity and the distribution of reinforcement in concrete mix.

The reinforcement in concrete completely transforms the performance of the material. Thanks to the continuity of the steel reinforcement, separate elements of a building become homogeneous and monolithic. As a result, all elements act together. Moreover, a reinforced concrete beam-and-slab system is structurally more efficient than a wooden floor composed of separate joints. When a series of beams and columns are rigidly connected together, they form a frame which distributes the loads and stresses of one part to all the others. And the entire framework becomes a unified whole.

Reinforced concrete offers technical advance over traditional post-and-beam construction. Supports are smaller, spans are wider and there is no limit to height. Besides reinforced concrete walls can also be thinner.

In comparison with a steel-framed structure considerations of weight, assembly method, speed of erection and other factors will help to determine which is more preferable.

In such buildings as office blocks reinforced concrete has two potential advantages – it will not need further fireproofing and is earthquake-resistant where necessary. Reinforced concrete structures are concreted in moulds of the require size called formwork, which can be made of timber, steel, plastic, or fibreglass. There are in-situ and precast reinforced concrete structures. They economize metal and timber, lower the cost of building and raise the productivity of labour. Reinforced concrete has been widely used in construction since the 19th century throughout, as bearing elements: beams, floors, spans, columns, panels, etc. Today reinforced concrete is one of the main building materials in construction.

V. Fill in the correct prepositions and translate the sentences into Russian.

1. Reinforced concrete is a combination ... two materials: steel and concrete.
2. It's strong, durable, heavyweight ... high compressive strength and good elastic properties.
3. ... introduce steel ... concrete the method ... reinforcement is generally used.
4. It consists ... putting a wire mesh or a system ... rods ... the concrete ... definite proportions.
5. the continuity ... the steel reinforcement separate elements ... a building become homogeneous and monolithic.
6. Reinforced concrete offers technical advance ... traditional post-and-beam construction.
7. Reinforced concrete structures are concreted ... special forms.
8. They lower the cost ... building and raise the productivity ... labour.
9. Reinforced concrete has been used ... construction ... the 19th century.
10. It is one ... the main building materials ... modern construction.

VI. Learn the dialogue.

A – Let's discuss placing the reinforcement in foundations.

B – With pleasure.

A – Do you think the process of placing the reinforcement in foundations is simple?

B – No, I don't. It can't be simple. It requires much knowledge about the behaviour of the material under loads.

A – That's why specialists have to calculate the quantity and the distribution of reinforcement in concrete mix accurately.

B – And what is the essence of reinforcing concrete?

A – When concrete hardens the resulting material gains great strength.

B – I see, thank you.

VII. Translate the sentences into English.

1. Железобетон – основной конструктивный строительный материал.

2. Железобетон – это сочетание двух материалов: стали и бетона.

3. Железобетон появился на рубеже 19-20 веков и с тех пор используется в различных видах строительства.

4. Арматуру укладывают в специальную форму (опалубку) и заливают бетоном.

5. Специалисты рассчитывают не только количество арматуры, но и ее распределение в бетоне.

6. Железобетон имеет преимущества стали и бетона: прочность стали на растяжение и высокую прочность на сжатие бетона.

7. Изготавливают два вида железобетонных конструкций: монолитные и сборные.

8. Железобетонные конструкции экономят металл, древесину и снижают стоимость строительства.

9. Железобетонные сооружения безопасны, экономичны и выдерживают большие нагрузки.

10. Текст рассказывает о железобетоне, его свойствах, методе армирования, видах железобетонных конструкций, их преимуществах и широком применении в современном строительстве.

VIII. Answer the following questions.

1. What building material is the text about?
2. What is reinforced concrete?
3. What properties does reinforced concrete have?
4. What is the method of reinforcement?
5. How does the reinforcement in concrete transform the performance of the material?
6. Why does reinforced concrete offer technical advance over traditional post-and-beam construction?
7. What potential advantages does reinforced concrete have in such buildings as office blocks?
8. What reinforced concrete structures do you know?
9. What are their advantages?
10. What is reinforced concrete used in construction for?

IX. Give the annotation of the text.

X. Speak about reinforced concrete – one of the main building materials in modern construction. Make use of the key word combinations and expressions.

a combination of two materials, valuable properties, high compressive strength, good elastic properties, the method of reinforcement, reinforced concrete constructions, monolithic and precast, their advantages, bearing elements, post-and-beam construction, transforms the performance

1. I'm going to speak about... – я собираюсь рассказать о...
2. I want to speak about... - я хочу рассказать о...
3. I would like to tell you about... - я бы хотел рассказать о...
4. First of all it is necessary to mention that... – прежде всего, необходимо упомянуть, что...
5. It's important to add that ... – важно добавить, что ...

LESSON 14

Phonetics: [kw], [ks], [gz], [aɪ]

Grammar: Subject/Object questions

Text: Straw. Солома

I. Read and translate the following words into Russian:

square, quickly, quality, question, quantity, require, liquid, equal, request; text, next, box, six, fix, mixing, extra, complex, expect, explain; exam, exist, example, exact, exceed, excellent, examinant, except; high, right, light, mild, might, flight, kind, find, minus, mine.

II. Learn the vocabulary:

straw [strɔ:] – солома;

to trace back [treɪs] – брать начало, восходить, уходить корнями;

initially [ɪ'nɪʃəli] – первоначально, вначале;

waterproof ['wɔ:təpru:f] – водонепроницаемый;

reinforcement [ˌri:ɪn'fɔ:smənt] – армирующий материал;

mud [mʌd] – грязь;

notably ['nəʊtəbli] – особенно;

arid ['ærid] – засушливый;

bale [beɪl] – брикет, тюк;

straw bale – соломенный брикет, соломенный тюк;

baling machine – пресс-подборщик;

load-bearing ['ləʊdbɛərɪŋ] – несущий;

non-load bearing – ненесущий;

infill ['ɪnfɪl] – заполнение;

wall [wɔ:l] – стена;

to stack [stæk] – складывать, укладывать;

floor plate – лист настила, плита настила;

joist [dʒɔɪst] – балка перекрытия (обычно второстепенная), вспомогательная балка, перекладина (поперечная балка, например, настила);

roof [ru:f] – крыша;

span [spæn] – пролет (здания);

renewable [rɪ'nju:əbl] – возобновляемый;

in situ [ˌɪn 'sɪtju:], [ˌɪn 'saɪtu:] – монолитный, на стройплощадке;

prefabricated [ˌpri:'fæbrɪkeɪtɪd] – сборный, заводского изготовления, изготовленный заранее (о блоке, детали, элементе конструкции);

approach [ə'prəʊtʃ] – подход, метод, способ;

thereby [ˌðeə'baɪ] – таким образом, тем самым;

embodied [ɪm'bɒdɪd] energy ['enədʒɪ] – воплощенная энергия, энергетические затраты на производство и эксплуатацию;

airtightness ['eətaɪtnəs] – герметичность, воздухонепроницаемость;
 to prevent [prɪ'vent] – предотвращать;
 excessive [ɪk'sesɪv] – излишний, чрезмерный;
 moisture ['mɔɪstʃə] – влажность, влага;
 ingress ['ɪngres] – проникновение, попадание;
 loose [lu:s] – неупакованный;
 to sweep (swept, swept) [swi:p] – подметать.

III. Study the information about subject and object questions.

Вопросы к подлежащему мы задаем, когда хотим узнать, кто или что выполняет действие.

Вопросы к подлежащему начинаются со слов **who (кто)** или **what (что?)**. Вопросы к определению подлежащего – со слов **what/which (какой?)**, **whose (чей?)**, **how much (неисчисляемые существительные)/how many (исчисляемые существительные) (сколько?)**. Порядок слов в таких вопросах не меняется.

При постановке вопроса к подлежащему нужно убрать подлежащее, вместо него поставить вопросительное слово **who** или **what**, а все члены предложения оставить на своих местах.

При постановке вопроса к определению подлежащего, необходимо оставить подлежащее и все члены предложения на своих местах, а перед подлежащим поставить вопросительное слово **what/which, whose** или **how much/how many**.

Subject	Verb	Object
David	visited	Linda.
Who	visited	Linda?
Straw	absorbs	carbon dioxide.
What	absorbs	carbon dioxide?
Loose straw	presents	a fire risk.
What straw	presents	a fire risk?
Peter's house	is made	of straw.
Whose house	is made	of straw?
Three houses	were made	of straw.
How many houses	were made	of straw?

Note! После вопросительных слов **who** и **what** глагол должен стоять в форме **3 лица единственного числа** даже, если в предложении, к которому задается вопрос, глагол во множественном числе. Таким образом, утвердительное предложение во 2 или 3 лице множественном числе в вопросе ставится в третьем лице единственном числе:

They are building a straw house. => Who is building a straw house?
 или утвердительное предложение во 2 лице множественном числе становится вопросом в третьем лице единственном числе:

We are building a straw house. => Who is building a straw house?

Note! What и **which** используются в английском языке, когда речь идет о выборе. В том случае, если этот выбор ограничен, обычно используется **which**:

Which of these three straw-bale houses has the best design?

OR

Which building material do you prefer? **Straw or brick?**

BUT

What building material do you prefer?

Вопросы к дополнению мы задаем, когда хотим выяснить, на кого или на что направлено действие. Они начинаются со слов **who, what** или **which**. В таких вопросах меняется порядок слов, который выглядит следующим образом: 1) вопросительное слово **who, what** или **which**; 2) вспомогательный глагол; 3) подлежащее; 4) смысловой глагол 5) все остальные члены предложения (если они есть).

Subject	Verb	Object
Robert	visited	Linda.
Who	did Robert visit?	
Straw	absorbs	carbon dioxide.
What	does straw absorb?	
Loose straw	presents	a fire risk.
What risk	does loose straw present?	
Which risk	does loose straw present?	A fire risk or flood risk?

IV. Write questions to which the words in bold are the answers.

1. **Ancient Egyptians** made buildings using bricks made of mud and straw.

Who made buildings using bricks made of mud and straw?

2. Straw minimises **load** on foundations.

3. **Straw** was initially used as a waterproof covering to simple timber framed shelters.

4. More people are now building **straw-bale houses**.

5. **We** are now building a straw-bale house.

6. Straw provides **good** airtightness.

7. **Straw** dust can cause breathing difficulties for people with allergies.

8. **Straw bales** were first used for building over a century ago by settlers in Nebraska, USA, shortly after the invention of baling machines.

9. Straw reduces **the need for materials with high embodied energy**.

10. Straw has **very good insulation** properties.

11. People have used **straw** as a building material for centuries for thatch roofing.

12. **Bath researchers** developed straw houses with zero carbon footprint.

V. Match eco-friendly building materials with their definitions. Translate the information into Russian.

1) mycelium	a) is an interesting building material made of sawdust and concrete mixed together.
2) ferrock	b) is made from the tree bark of cork oak and does not absorb water or rot. Likewise, if left uncoated – it is naturally fire resistant. It is ideal for flooring and insulation sheets due to its noise as well as shock adsorption attributes.
3) straw bale	c) is a futuristic building material which comprises the root structure of fungi and mushrooms.
4) timbercrete	d) is flexible and durable. Moreover, it is called “green steel” because it has the tensile strength of steel.
5) grasscrete	e) is a new material being researched that uses recycled materials including steel dust from the steel industry to create a concrete-like building material that is even stronger than concrete and absorbs carbon dioxide as part of its drying and hardening process.
6) cork	f) is a renewable resource that can be used to replace concrete, plaster, wood, fibreglass, stone and gypsum when building walls. It has good fire resistance as well as insulating qualities.
7) hempcrete	g) is reinforced cellular cast on site concrete within which you can either grow natural grass or fill its cavities with gravel. It is an environmental solution that helps in providing aesthetically pleasing and environmentally friendly urban surroundings.
8) bamboo	h) is formed from the inner fibres of hemp plants. The hemp fibres are treated with lime to create concrete-like shapes which are not only durable but super lightweight.

VI. Read and translate the text.

STRAW



Fig. 4. Sworders' auction rooms, Stansted Mountfitchet, Essex – a single-storey 1100 m² building, constructed in 2008 using straw-bale wall construction

The use of straw in construction has been traced back at least 10,000 years. It was initially used as a waterproof covering to simple timber framed shelters. As early as 7,000 years BC it began to be used as a reinforcement in the production of mud bricks in South Asia. This use has continued to the present day (notably in African and Asian countries with arid climates).

Straw bales were first used for building over a century ago by settlers in Nebraska, USA, shortly after the invention of baling machines. Straw-bale construction is a method of building that uses bales of straw. They may be used in both infill (non-load bearing) and load-bearing wall applications. With loadbearing construction bales are stacked like bricks, and take the weight of the floor plate, joists and roof. With the infill method the weight of the roof and floors is carried by a timber, steel or concrete framework. This method allows wider spans and larger openings, but tends to be more expensive.

The advantages of straw are that it is cheap, widely available and a good insulator. Besides being a low-cost renewable material, straw is suitable for in situ and prefabricated approaches. Thanks to its light weight, straw minimises load on foundations, thereby reducing the need for materials with high embodied energy such as concrete. Moreover, straw provides good airtightness.

However, as well as several benefits, there are also disadvantages of straw-bale construction. The primary concerns on site are preventing excessive moisture ingress and minimising the risk of fire. While the finished straw bale wall has good fire resistance, loose straw presents a notable fire risk and the site should be swept regularly.

Nowadays straw-bale construction is growing in popularity all over the world as an eco-friendly and cheap construction method.

VII. Fill in the correct prepositions and translate the sentences into Russian.

1. Straw was initially used ... a waterproof covering ... simple timber framed shelters.

2. There are two main types ... construction: load-bearing and infill.

3. Straw-bale construction is considered ... have a low environmental impact and provide good thermal insulation properties.

4. Although the use ... straw is widespread ... roof construction ... the form ... thatching, straw bales ... a modern construction method are gaining ... popularity.

5. Straw-bale construction is popular ... self builders and the environmentally conscious.

6. ... the infill method the weight ... the roof and floors is carried ... a timber, steel or concrete framework.

7. Infill straw bale construction uses a frame construction that is then filled ... the straw bale ... an insulating material.

8. When building the load-bearing method, it can be difficult ... protect the bales ... the weather.

9. The primary concerns ... site are preventing excessive moisture ingress and minimising the risk ... fire.

10. When using straw ... construction, both the unique properties ... the material and the method ... working ... it need ... be considered ... the beginning ... the design process.

VIII. Rewrite the sentences in the passive.

1. In 2014-15, the University of Bath undertook research into straw bale construction.

2. Straw offers a welcome solution to housing's greenhouse gas emissions.

3. Straw minimises load on foundations.

4. People have used straw as a building material for centuries for thatch roofing.

5. Ancient Egyptians made buildings using bricks made of mud and straw.

6. Straw provides good airtightness.

7. More people are now building straw-bale houses.

8. Loose straw presents a notable fire risk.

9. Straw dust can cause breathing difficulties for people with allergies.

10. People will build more straw-bale houses in the near future.

IX. Translate the sentences into English.

1. Использование соломы в строительстве началось 10 000 лет назад.

2. Солома – это экологически чистый строительный материал.

3. Строительство из соломенных тюков началось в США.

4. В домах с несущими соломенными стенами брикеты укладываются как кирпичи.

5. В каркасных домах с соломенным заполнением деревянный, стальной или бетонный каркас удерживает вес крыши и перекрытий, а солома в стенах служит в качестве теплоизолятора.

6. Строительство из соломенных тюков имеет свои преимущества и недостатки.

7. Преимущества строительства из соломенных тюков перевешивают недостатки.

8. Солома сокращает нагрузку на фундамент благодаря своему легкому весу.

9. Строители сейчас закладывают фундамент для нового соломенного дома.

10. В настоящее время строительство из соломенных брикетов набирает популярность во всем мире.

X. Answer the following questions.

1. What building material is the text about?

2. How was straw initially used?

3. When and where did straw begin to be used as a reinforcement in the production of mud bricks?
4. What is straw-bale construction?
5. What is the difference between load-bearing and infill straw bale construction?
6. What are the advantages of straw?
7. Is straw suitable for in situ or prefabricated approaches?
8. What does straw minimise thanks to its light weight?
9. What are the disadvantages of straw-bale construction?
10. Why is straw-bale construction growing in popularity all over the world?

XI. Write a summary of the text.

XII. Speak about straw as a building material.

LESSON 15

Phonetics: [eə], [ɜ:]

Grammar: Past tenses. Articles

Text: Hydraulic Cement. Гидравлический цемент

I. Read and translate the following words into Russian:

pare, fare, chair, parents, where, hair, stare, staircase, there, care, their;
curl, girl, first, serve, purse, hurt, turn, learn, bird, dirty, early, verb, earth, shirt, hurl.

II. Open the brackets. Identify the tenses, and then match them with the correct description.

1. He (to go) on a safari holiday last month.
2. He (to travel) in Europe when he (to have) an accident.
3. He (to be) to Russia twice before he took me there.
4. He (to fly) to Paris while I (to head for) Rome.
5. This time last year he (to enjoy) himself on a beach in Riviera.
6. The rain (to fall) heavily and the wind (to blow). A few people (to walk) hurriedly down the street.

- a) past action in progress interrupted by another past action;
- b) past action which happened before another past action;
- c) complete action which happened at a stated past time;
- d) simultaneous past actions of certain duration;
- e) simultaneous past actions which describe a scene;
- f) action in the middle of happening at a stated past time.

III. Open the brackets and put the verbs into the correct forms.

1. James (to leave) when Ashley (to arrive).
2. Doctors say that smoking (to destroy) vitamin C in the body.
3. As we (to surf) the Internet we (to find) a website about horoscopes.
4. A: How was your first day in your new job?
B: Oh, quite good really, although it (to start) badly because my car (to break down) on the way.
5. A: (to have) any problems?
B: Not really. Everyone was really nice. I (to have) a problem with the coffee machine, though.
A: Don't tell me you (to break) it!
B: Yes! How did you guess? I (to put) my money in when it (to make) a strange noise. Then, the coffee (to pour) out all over the floor! It (to break) the day before and they (to forget) to tell me!
6. I (to finish) the book next week.
7. I (to lie) on the beach at this time tomorrow.
8. That's the man whose daughter (to win) a gold medal in the Olympics.

IV. Put the verbs in brackets into the correct tense form.

- A. When Sheila 1) *arrived* home she 2) (to take off) her wet shoes and 3)(to hang up) her coat. Outside, the wind 4)..... (to blow) wildly and the windows 5)(to rattle). She 6)..... (to walk) into the kitchen, 7) (to feed) the cat and 8) (to be) just about to make herself a sandwich when she 9) (to hear) someone whisper her name.
- B. We 1) (to have) dinner when the doorbell 2)..... (to ring). My father 3) (to get up) and 4) (to open) the door. A man 5) (to come) rushing in. "I'm sorry to bother you," he said "but my wife and I 6) (to drive) along the road when we 7) (to have) an accident. There 8) (to be) no one to help us so I 9)..... (to come) here."

V. Study the meanings of the word "bear" and say what meaning it has in the text below.

- Bear responsibility – нести ответственность;
- Bear losses – нести потери;
- Bear one's name – носить имя;
- Bear the news – передавать новости;
- Bear the upper storey – поддерживать верхний этаж;
- Bear on the columns – опираться на колонны;
- Bear – медведь; грубый, невоспитанный человек;
- Bear in mind – помнить, иметь в виду.

IV. Put the verbs in brackets into the correct tense form.

Once upon a time there ... (to be) Three Bears who ... (to live) together in a house of their own, in a wood. One of them ... (to be) Little Wee Bear, and one ... (to be) Middle-sized Bear, and the other ... (to be) Great Big Bear. They ... (to have) each a bowl for their porridge; a little bowl for the Little Wee Bear; and a middle-sized bowl for the Middle-sized Bear; and a great bowl for the Great Big Bear. And they ... (to have) each a chair to sit in; a little chair for the Little Wee Bear; and a middle-sized chair for the Middle-sized Bear; and a great chair for the Great Big Bear. And they ... (to have) each a bed to sleep in; a little bed for the Little Wee Bear; and a middle-sized bed for the Middle-sized Bear; and a great bed for the Great Big Bear. One day, after they ... (to make) porridge for their breakfast, and ... (to pour) it into their porridge-bowls, they ... (to walk) out into the wood while the porridge ... (to cool), that they might not burn their mouths by beginning too soon, for they ... (to be) polite, well-brought-up Bears. And while they ... (to be) away a little girl called Goldilocks, who ... (to live) at the other side of the wood and ... (to send) on the errand by her mother, ... (to pass) by the house, and ... (to look) in the window. And then she ... (to peep) in at a keyhole, for she ... (to be) not at all a well-brought-up little girl. Then seeing nobody in the house she ... (to lift) the latch. The door was not fastened, because the Bears ... (to be) good Bears, who ... (to do) nobody any harm, and never ... (to suspect) that anybody would harm them.

VII. Learn the vocabulary:

binding ['baɪndɪŋ] medium ['mi:diəm] – вяжущий элемент;
embedded [ɪm'bedɪd] – заполненный;
paste [peɪst] – паста;
admixture [əd'mɪkstʃə] – примесь;
chemical ['kemɪkəl] reaction [rɪ'ækʃn] – химическая реакция;
to be capable of ['keɪpəbl] – быть способным на что-либо;
hydration [haɪ'dreɪʃn] – гидратация;
solid ['sɒlɪd] – твердый, плотный;
to blend [blend] – смешивать;
blast-furnace ['blɑ:st, fɜ:nɪs] slag [slæɡ] – доменный шлак;
pozzolan ['pɒtsələn] – пуццолан;
fly [flaɪ] ash [æʃ] – зольная пыль;
silica ['sɪlɪkə] fume [fju:m] – кварцевая пыль;
to adhere (to) [əd'hiə] – прилипать, приклеиваться, схватываться;
calcium-silicate hydrate ['kælsiəm sɪlɪkɪt 'haɪdreɪt] – гидрат силиката кальция;
strength of the concrete [streŋθ] – прочность бетона;
increase [ɪn'kri:s] – увеличивать;
moisture ['mɔɪstʃə] – влага, влажный;
hardened [hɑ:dnd] concrete – затвердевший бетон;

non-shrinkable [nɒn-'ʃrɪŋkəbl] – не подверженный усадке;
non-rusting [nɒn-'rʌstɪŋ] – не подверженный ржавчине.

VIII. Read and translate the text.

HYDRAULIC CEMENT

Concrete is a composite material that consists of a binding medium embedded with fine aggregate (typically sand) and coarse aggregate (typically gravel). In hydraulic cement concrete, the binder is cement paste, a mixture of hydraulic cement and water, and possibly one or more admixtures.

In ancient times, hydraulic cement was firstly used by the Romans. Hydraulic cement is best suitable for the structures which are constantly in the contact with water.

Hydraulic cement is cement that sets and hardens by chemical reaction with water (hydration) and is capable of doing so under water. The hydration reactions result in the formation of a hard solid mass. The most widely used hydraulic cement is Portland cement. Other kinds of hydraulic cement include blended cements and ground granulated blast-furnace slag. Pozzolans, both natural and artificial (fly ash and silica fume) are often used as a cementitious ingredient of concrete.

When hydraulic cement is mixed with water to form a paste, the phases of the cement react with the water (hydration) to form a slowly developing cementitious structure that adheres to and binds together the fine-and coarse-aggregate particles to form hardened concrete. The most abundant hydration product is calcium-silicate hydrate. As long as moisture and unhydrated cement particles are present, the hydration products continue to form, increasing the strength of the concrete. Hydraulic cement sets within 5-10 minutes after adding water to it.

Nowadays hydraulic cement is widely used in the construction industry because it is non-shrinkable, non-corrosive and non-rusting.

IX. Fill in the correct prepositions and translate the sentences into Russian.

1. Concrete is a composite material that consists ... a binding medium embedded ... fine aggregate.
2. ... ancient times, hydraulic cement was firstly used ... the Romans.
3. Hydraulic cement is cement that sets and hardens ... chemical reaction ... water (hydration) and is capable ... doing so ... water.
4. The hydration reactions result ... the formation ... a hard solid mass.
5. Pozzolans, both natural and artificial are often used ... a cementitious ingredient ... concrete.
6. Other kinds ... hydraulic cement include blended cements and ground granulated blast-furnace slag.
7. Slowly developing cementitious structure adheres ... and binds ... the fine-and coarse-aggregate particles ... form hardened concrete.

8. When hydraulic cement is mixed ... water ... form a paste, the phases ... the cement react ... the water.

9. As long as moisture and unhydrated cement particles are present, the hydration products continue ... form.

10. Nowadays hydraulic cement is widely used ... the construction industry.

X. Translate the sentences into English.

1. В гидравлическом бетоне в качестве связующего вещества применяют цементную пасту – смесь гидравлического цемента и воды.

2. В древности гидравлический цемент впервые использовали римляне.

3. Гидравлический цемент лучше всего подходит для конструкций, постоянно находящихся в контакте с водой.

4. Гидравлический цемент – цемент, который схватывается и твердеет в результате химической реакции с водой и сохраняет это свойство под водой и на воздухе.

5. Наиболее широко применяется портландцемент.

6. Пуццоланы, как природные, так и искусственные (золевая пыль, кварцевая пыль), часто используются в качестве цементирующей добавки для бетона.

7. Когда гидравлический цемент смешивают с водой до консистенции пасты, минералы цемента реагируют с водой, образуя цементный камень, который связывает частицы мелкого и крупного заполнителя, формируя структуру бетона.

8. Гидравлический цемент схватывается через 5-10 минут после добавления воды.

9. Гидравлический цемент не подвержен усадке, не вызывает коррозии и ржавчины.

10. Сегодня гидравлический цемент широко применяется в промышленном строительстве.

XI. Answer the following questions.

1. What building material is the text about?

2. What is hydraulic cement?

3. What binding materials are used to prepare hydraulic cement?

4. Which materials are often used as a cementitious ingredient of concrete?

5. What takes place while hydraulic concrete is being prepared?

6. What kinds of hydraulic cement are there?

7. What hydraulic cement is the most popular?

8. What is the most abundant hydration product?

9. Where is hydraulic cement applied?

10. Why hydraulic cement is widely used in the construction industry?

XII. Put all possible questions to the sentences.

1. The hydration reactions result in the formation of a hard solid mass.
2. Other kinds of hydraulic cement include blended cements and ground granulated blast-furnace slag.
3. Hydraulic cement is widely used in the construction industry because it is non-shrinkable, non-corrosive and non-rusting.

XIII. Give the annotation of the text and speak about hydraulic cement.

LESSON 16

Phonetics: [ʌ], [ɑ:], [ɔ:]

Grammar: Perfect Passive

Text: Parts of a Building. Части здания

I. Read and translate the following words into Russian:

some, public, covered, other, multi-storey, industrial, structure, constructive, function, study, confront, subject, result;
vast, after, past, architect, rafter, last, part, are, arch, task, plant, dark, ask;
more, order, all, form, boarding, wall, floor, also, for, always, straw.

II. Learn the vocabulary:

to devote [di'vəʊt] – посвящать;
creative [kri'eɪtɪv] energies ['enədʒɪz] – творческие усилия;
to reflect [rɪ'flekt] – отражать;
society [sə'saɪəti] – общество;
art form ['ɑ:t fɔ:m] – образец искусства;
to surround [sə'raʊnd] – окружать;
vast [vɑ:st] majority [mə'dʒɔ:ɪti] – громадное большинство;
to provide [prə'vaɪd] shelter ['ʃeltə] – обеспечить кров;
choice [tʃɔɪs] – выбор;
excavation [ˌɛkskə'veɪʃn] – котлован;
to dig (dug, dug) – копать;
superstructure ['su:pəstrʌktʃə] – надстройка, часть здания выше фундамента;
to keep (kept, kept) (from) – предохранять (от);
soil [sɔɪl] – грунт;
fraction [frækʃn] – фракция;
binding wire ['baɪndɪŋ 'waɪə] – вязальная (арматурная) проволока;
foundation [faʊn'deɪʃn] block [blɒk] – фундаментный блок;

stability [stə'bilɪti] – устойчивость;
 to carry the ['kæri] loads [ləʊdz] – нести нагрузку;
 to clothe [kləʊð] – заполнять;
 to divide into [di'vaɪd] stories ['stɔ:ri:z] – делить на этажи;
 to support [sə'pɔ:t] – поддерживать;
 to protect [prə'tekt] – защищать;
 wall [wɔ:l] – стена;
 floor [flɔ:] – перекрытие;
 to tie [taɪ] – связывать;
 flat [flæt] roof [ru:f] – плоская крыша;
 pitched [pɪtʃt] roof [ru:f] – скатная крыша;
 tiles [taɪlz] – черепица;
 slate [sleɪt] – натуральный шифер, природный шифер, сланец;
 roofing ['ru:fiŋ] felt [felt] – рубероид;
 galvanized [gælvənaɪzd] corrugated ['kɒrəgeɪtɪd] sheeting ['ʃi:tɪŋ] – оцинкованные гофрированные листы.

III. Study the model and compare the following sentences in their meanings.

Model: to have + been + Participle II

He **has just been brought** several books.
 Ему только что принесли несколько книг.

He **had been brought** several books before the conference began.
 Ему принесли несколько книг до начала конференции.

He **will have been brought** several books before the conference began.
 Ему принесут несколько книг перед началом конференции.

1. In order to build a house first an excavation was dug.
 In order to build a house first an excavation had already been dug.

2. Plans for building a house are drawn by an architect.
 Plans for building the house have already been drawn by an architect.

3. Then a framework will be raised.
 The framework will have been raised by Wednesday.

4. Floors were made of timber, eco-friendly building material.
 Floors had been made of timber after the test's results.

5. Every detail of a house is carefully planned.
Every detail of the house has just been carefully examined.

IV. Change Simple Passive into Perfect Passive and translate the sentences into Russian.

1. Modern projects were paid much attention to.
2. The construction of a residential house for one family was completed.
3. Many building materials will be used to decorate the facades of old structures.
4. What was done first when building a house?
5. Buildings were designed either to live in or to work at.
6. A foundation will be constructed to anchor the superstructure of a building, keep the walls and floors from the contact with soil, and transmit the loads of a building to the earth.
7. New building materials were not divided into three groups.
8. Wood, tiles made of baked clay or slate, roofing felt, galvanized corrugated sheeting will be recommended for roofs.
9. The video was recorded by him.
10. The work was done.

V. Read and translate the text.

PARTS OF A BUILDING

Since the beginning of civilization man has always been a builder, devoting creative energies to the construction of buildings to live in and to work at. A building reflects the society of its time more than any other art form.

The meaning of any building depends on the materials used and the function it is designed to perform. The vast majority of buildings consist of external walls, surrounding an interior space and covered by a roof to provide shelter.

Three basic factors - availability, physical properties and cost determine the initial choice of a building. The main parts of a building are a foundation, a framework, floors and a roof.

In order to build a house first an excavation must be dug. After that, a foundation is constructed. It anchors the superstructure of a building, keeps the walls and floors from the contact with soil, and transmits the loads of a building to the earth. The materials used for foundations are sand, cement, crushed stone of different fractions, reinforcement, binding wire, foundation blocks.

Then a framework is raised. A framework is the part of a building on which the stability of the structure depends. This part of a building carries the loads from the roof and floors. A framework is clothed with various materials in the form of panels. The materials for a framework are usually timber, wood board, steel or reinforced concrete, etc.

Floors divide the building into stories. They may be of timber, metal, reinforced concrete or other materials. Floors are supported on beams. A roof is the top-

most part of a building. Its function is to cover the building and protect people and things inside against rain, wind, snow, and sunlight. Roofs also tie the walls and give strength to the structure. There are two main types of roofs: flat and pitched. Wood, tiles made of baked clay or slate, roofing felt, galvanized corrugated sheeting, and other materials are used for roofs.

VI. Memorize the following antonyms:

- | | |
|---------------------------|-------------------------------------|
| 1) to begin – to stop; | 9) expensive – inexpensive (cheap); |
| 2) thick – thin; | 10) favourable – unfavourable; |
| 3) active – passive; | 11) accurate – inaccurate; |
| 4) to fulfil – to fail; | 12) positive – negative; |
| 5) complete – incomplete; | 13) useful – useless; |
| 6) enormous – tiny; | 14) valuable – invaluable; |
| 7) strong – weak; | 15) flexible – inflexible; |
| 8) beautiful – ugly; | 16) warm – cold. |

VII. Fill in the correct prepositions and translate the sentences into Russian.

1. Man has always been a builder, devoting creative energies ... the construction ... buildings ... live ... and ... work

2. The meaning ... any building depends ... the materials used and the function it is designed ... perform.

3. The main parts ... a building are a foundation, a framework, floors and a roof.

4. ... build a house first an excavation is dug.

5. A foundation is constructed ... keep the walls and floors ... the contact ... soil.

6. The materials used ... foundations are sand, cement, crushed stone ... different fractions, reinforcement, binding wire, foundation blocks.

7. Floors may be ... timber, reinforced concrete or other materials.

8. A roof is the topmost part ... a building.

9. Its function is ... cover the building and protect people and things inside ... rain, wind, snow and sunlight.

10. Wood, tiles made ... baked clay or slate, roofing felt, galvanized corrugated sheeting, and other materials are used ... roofs.

VIII. Write questions to which the words in bold are the answers.

1. A building reflects **the society of its time**.

2. The meaning of any building depends on **the materials used**.

3. **Three basic factors - availability, physical properties and cost** determine the initial choice of a building.

4. **Buildings** consist of external walls, surrounding an interior space and covered by a roof to provide shelter.

5. A foundation anchors **the superstructure of a building**.
6. **A foundation** transmits the loads of a building to the earth.
7. **A framework** is clothed with various materials in the form of panels.
8. **Floors** divide the building into stories.
9. **Wood, tiles made of baked clay or slate, roofing felt, galvanized corrugated sheeting, and other materials** are used for roofs.
10. **Roofs** tie the walls and give strength to the structure.

IX. Match the English and Russian equivalents:

- | | |
|-----------------------------|------------------------------------|
| 1) a multi-storey building; | a) наружная стена; |
| 2) plinth floor; | b) чердачное перекрытие; |
| 3) cornice; | с) карниз; |
| 4) roof boarding; | d) обрешетка кровельного покрытия; |
| 5) strip foundation; | e) цокольное перекрытие; |
| 6) constructive scheme; | f) ленточный фундамент; |
| 7) intermediate floor; | g) лестничный марш; |
| 8) landing; | h) стропило; |
| 9) external wall; | i) внутренняя стена; |
| 10) attic floor; | j) конструктивная схема; |
| 11) internal wall; | к) лестничная площадка; |
| 12) flight; | l) многоэтажное здание; |
| 13) rafter. | m) междуэтажное перекрытие. |

X. Learn the dialogue.

A – Can you say a few words about the main constructive elements of a building?

B – Certainly. The main constructive elements are a framework, a foundation, walls, floors, a roof.

A – And what part of a building is the most important?

B – Well, it's known that all parts of any building are equally important. Do you agree with me?

A – Surely. What building materials would you prefer for a house?

B – I think that concrete blocks are better for a foundation and bricks are good for bearing walls.

A – And what about floors and a roof?

B – Well, reinforced concrete is the most suitable material for floors and slate is the proper material for a pitched roof.

XI. Translate the sentences into English.

1. Фундамент – опорная часть здания, которая передает (to transmit) нагрузки от здания на грунт.

2. Наружные стены служат (to serve) для ограждения помещений (to enclose rooms) от внешней среды, а также для защиты (to protect from) от атмосферных воздействий.

3. Внутренние стены служат для отделения (to serve as partitions) одних помещений от других.

4. Каркас – это часть здания, от которой зависит (to depend) устойчивость конструкции.

5. Каркас распределяет (to carry the loads) нагрузки от крыши и перекрытий.

6. Крыши связывают (to tie) стены и придают прочность (to give strength to) конструкции.

7. Перекрытия бывают (may be) цокольными, подвальными, междуэтажными и чердачными.

8. Перекрытия поддерживаются (to support) балками.

9. Перегородки делят (to divide into) внутреннее пространство здания на отдельные помещения на одном этаже.

10. Часть лестницы между площадками называется лестничным маршем (to call flight).

XII. Speaking practice. What can you say about:

- the constructive scheme of a multi-storey building (fig. 5);
- the main constructive elements of residential, public and industrial buildings;
- the construction process of a multi-storey building.

XIII. Answer the following questions.

1. What are the constructive elements of a building?
2. What is a foundation?
3. What is the function of a foundation?
4. What materials are used for foundations?
5. What is a framework?
6. What is the function of a framework?
7. What is the function of a floor?
8. What materials are floors made of?
9. What is the topmost part of a building?
10. What is the function of a roof?

XIV. Write a summary of the text.

XV. Speak about the main parts of a building and their functions using Fig. 5.

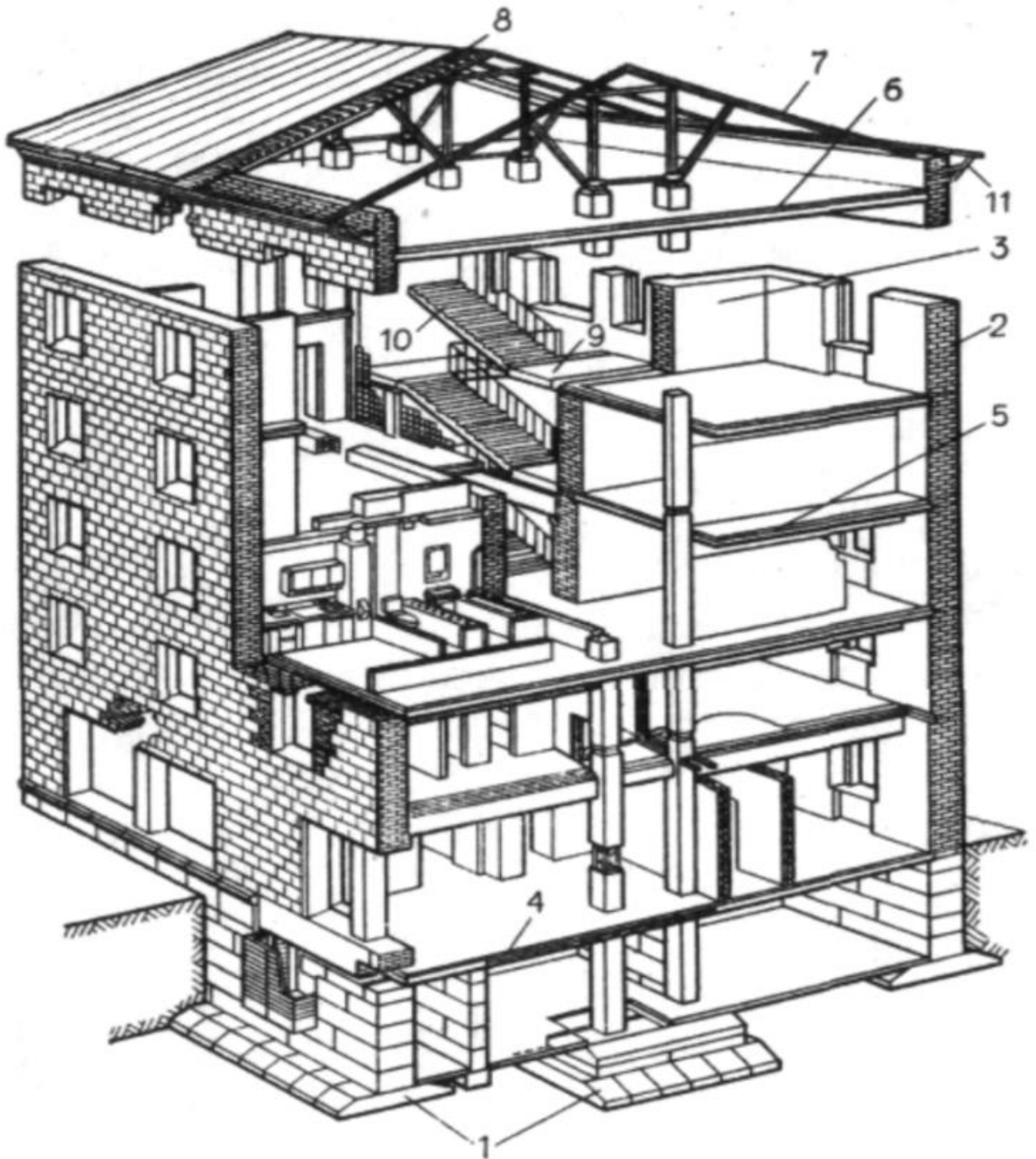


Fig. 5. Constructive scheme of a multi-storey building:

- 1 – strip foundation – ленточный фундамент; 2 – external wall – наружная стена;
 3 – internal wall – внутренняя стена; 4 - plinth floor – цокольное перекрытие;
 5 - intermediate floor – междуэтажное перекрытие; 6 – attic floor – чердачное перекрытие;
 7 – rafter – стропило; 8 – roof boarding – обрешетка кровельного покрытия,
 9 – landing – лестничная площадка; 10 – flight – лестничный марш;
 11 – eave = cornice – карниз

LESSON 17

How to work with the text.

Summary of the text.

Text: Conifer panels. Хвойные панели.

I. Study the information about the summary and scheme-reading of the text.

Summary is a short account giving the main points of the original in your own words.

Аннотация – это краткое изложение основных пунктов оригинала своими словами.

How to write a SUMMARY of the text

1. Look through the text and divide it into logical parts (paragraphs).
2. Write out the unknown words and translate them using a dictionary.
3. Choose the key words and word combinations.
4. Make up a plan and write a summary.

II. Read and translate the text in writing .

CONIFER PANELS



Fig. 6. Conifer panels

This material comes from the trend towards the use of eco-friendly products. The raw material for it is compressed spruce needles. The adhesive resin in the needles acts as a binder. No other chemicals are involved in production. The result is a sheet material that is used as a substrate for laminate and parquet boards.

Conifer panels are decorative, sound-absorbing panels made from conifer needles. The panels focus on sustainable material usage without harming the envi-

ronment. The needles of felled trees, which are usually discarded as waste, are collected and turned into wall panels.

The sound-absorbing fibre material is based on conifer needles and a biodegradable binder. It is possible to use fir needles, pine, spruce, larch, cedar, and other coniferous trees. The material is available in natural colours, varying from green to brown, and texture that creates forest atmosphere in the interior.

The common size of conifer panels is 590×850 mm, while the thickness can be 3-7 mm. They are laid on the floor diagonally, end-to-end, and fixed with tape to prevent spreading.

The panels are available in various shapes and sizes, with or without patterns.

Coniferous agglomerate retains heat well, but is not highly durable. In addition, it can become moldy in humid environments.

III. Ask 10 questions to the text.

IV. Write down the summary of the text.

ЗАКЛЮЧЕНИЕ

Учебное пособие «Традиционные и передовые строительные материалы» («Traditional and Modern Building Materials») предназначено для студентов бакалавриата и специалитета, изучающих английский язык в строительных и технических вузах.

Пособие создано в соответствии с программой «Иностранный язык» для неязыковых вузов и факультетов и рассчитано на 216 часов (108 часов аудиторных занятий и 108 часов самостоятельной работы).

В предлагаемом пособии представлен учебный материал по направлениям подготовки бакалавров «Строительство» (профили «Промышленное и гражданское строительство», «Производство и применение строительных материалов, изделий и конструкций», «Проектирование зданий и сооружений», «Экспертиза и управление недвижимостью»), «Материаловедение и технологии материалов» (профиль «Экспертиза качества строительных материалов»), а также по направлению подготовки специалистов «Строительство уникальных зданий и сооружений» (специализации «Строительство высотных и большепролетных зданий и сооружений», «Строительство подземных сооружений»). Пособие отличается системностью и единым структурным оформлением и позволит обучающимся приобрести навыки профессионально-ориентированной устной и письменной коммуникации на английском языке.

Пособие нацелено на обучение студентов навыкам чтения, перевода, пересказа текстов по строительной тематике и умение вести диалоги на профессиональные темы.

Учебное пособие состоит из 17 уроков-тем, посвященных современным строительным материалам и изделиям, соответствующим строительным направлениям.

Издание включает тексты как для аудиторного, так и для самостоятельного изучения. Пособие также включает систему упражнений на закрепление лексики, пополнение активного словаря и развития навыков профессионально-ориентированной устной и письменной речи. Пособие снабжено обширным спектром лексических и грамматических заданий.

Учебный материал пособия связан с будущей профессией студентов и является источником специализированных знаний, которые помогут обучающимся самостоятельно читать литературу по специальности, заниматься научно-исследовательской деятельностью; расширят общий кругозор, помогут стать специалистами широкого профиля, а также позволят участвовать в совместных проектах с зарубежными партнерами и откроют новые горизонты для дальнейшего карьерного роста.

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GRAMMAR REFERENCE
Грамматический справочник

Таблица П.1.1

Сводная таблица чтения английских гласных

Гласные буквы	Алфавитное чтение	Краткое чтение	Чтение в сочетании с последующим r		В сочетаниях ar, aw, all; a + l + согласная; wa + согласная; ou, ow, en, ew
			Гласная + гласная + r; гласная + r +	Гласная + r; гласная + r +	
a	[ei] clay ratio stage date table	[æ] ash sand slag began has	[eə] bearing repair spare air stairs	[a:] tar hard mark task plant	[o:] raw always install water pause
o	[ou] load motion stone cold follow	[o] bond cost drop problem office	[o:] core door portion before porous	[o:] forming mortar corner order report	[au] foundation brown ground allow
u	[ju:] use durable unique unit future	[ʌ] crush pump bulk subject plus	[ju] pure secure during fuel surely	[ə:] burning turn fur surface further	[o:] august autumn author audience
e	[i:] beam degree steel clean easy	[e] dense- setting test effect depth	[iə] near here engineer period career	[ə:] inert observe term learn person	[ju:] few knew view crew flew
i/y	[ai] dry fine type high vital	[i] inch system gyp- sum mix resist	[ai] prior tire = tyre wire supply trial	[ə:] fir dirty third birth circle	-

Таблица П.1.2

Порядок слов в вопросительном предложении

	Вопросительные слова	Вспомогательный или модальный глагол	Подлежащее	Неизменяемая часть сказуемого	Остальная часть предложения
Общий вопрос	-	Do	the students	receive	consultations by e-mail?
	-	Did	the teacher	return	the control papers?
	-	Will	the young men	take	examinations soon?
	-	Must	you	speaking	English every day?
	-	Is	your brother	a student?	-
	-	Was	he	reading	the written review?
	-	Has	she	read	the book?
Специальный вопрос	Where	do	the students	receive	consultations?
	When	did	the teacher	return	our tests?
	How many exams	will	the young men	take	in two months?
	Why	must	you	speaking	English every day?
	What	is	your brother?	-	-
	What review	was	he	reading?	-
	What	has	she	read?	-

Таблица П.1.3

Приставки с отрицательным значением

Un – не- без	reliable – надежный limited – ограниченный	un reliable – ненадежный un limited – безграничный
in - не- ir - без	active – активный resistable - устойчивый	in active – неактивный ir resistable - неустойчивый
im – il –	pure – чистый logical – логичный	im pure – смешанный il logical – нелогичный
non - не- бес-	productive – продуктивный contact – контактный	non -productive – непроизводительный non contact – бесконтактный
de- науч. термины	compression - давление frost – замораживать	de compression – снижение давления de frost – размораживать
dis - не- за-	comfort – комфорт belief – доверие	dis comfort – неудобство dis belief – заблуждение
mis – означает «неверно»	calculate – подсчитывать	mis calculate – ошибиться в расчете

Префиксы с разными значениями

re – снова еще раз	use – использовать read – читать	reuse – снова использовать reread – перечитать
super – сверх- над-	load – нагрузка pressure – давление	superload - дополнительная нагрузка superpressure - избыточное давление
over – сверх- пере- над-	design – проектирование heat – нагревать	overdesign - проектирование с запасом прочности overheat – перегревать
semi – полу-	rigid – жесткий skilled – квалифицированный	semirigid – полужесткий semiskilled – малоопытный
inter – между- взаимо-	action – действие space – пространство	interaction - взаимодействие interspace – промежуток, интервал
en – для образования глаголов	rich – богатый danger – опасность	enrich – обогащать, украшать endanger – подвергать опасности
pre – до- заранее	design – расчет tensioning – натяжение	predesign – предварительный расчет pre-tensioning – предварительное натяжение

Сводная таблица временных форм активного залога

Simple Tenses	Continuous Tenses	Perfect Tenses
Present		
I prepare mortar. (He prepares mortar).	I am preparing mortar.	I have prepared mortar. (He has prepared mortar).
Do I prepare mortar? (Does he prepare mortar?)	Am I preparing mortar?	Have I prepared mortar? (Has he prepared mortar?)
I do not prepare mortar. (He does not prepare mortar).	I am not preparing mortar.	I have not prepared mortar. (He has not prepared mortar).
Past		
I prepared mortar.	I was preparing mortar.	I had prepared mortar.
Did I prepare mortar?	Was I preparing mortar?	Had I prepared mortar?
I did not prepare mortar.	I was not preparing mortar.	I had not prepared mortar.
Fututre		
I will prepare mortar.	I will be preparing mortar.	I will have prepared mortar.
Will I prepare mortar?	Will I be preparing mortar?	Will I have prepared mortar?
I will not prepare mortar.	I will not be preparing mortar.	I will not have prepared mortar.

Таблица неправильных глаголов

Infinitive	Past Simple	Past Participle	Translation
arise	arose	arisen	возникать; происходить
awake	awoke	awoken	будить, просыпаться
be	was/were	been	быть
bear	bore	born(e)	нести, выдерживать груз, выносить, выдерживать (испытания) - past participle borne; рождаться (о человеке, животном, идее) - past participle passive be born
beat	beat	beaten	побеждать; избивать; бить; колотить
become	became	become	становиться
begin	began	begun	начинать
bend	bent	bent	сгибаться
bind	bound	bound	связывать
bite	bit	bitten	кусать; грызть; кусаться (о ценах)
bleed	bled	bled	кровоточить
blow	blew	blown	дуть; выдувать
break	broke	broken	ломать(ся); разрушать(ся)
breed	bred	bred	разводить (животных); порождать (презрение, невежество)
bring	brought	brought	привозить
build	built	built	строить
burn	burnt (burned)	burnt (burned)	жечь; обжигать
buy	bought	bought	покупать
can	could	been able to	мочь; уметь
cast	cast	cast	бросать; отбрасывать (тень); подвергать (сомнению); отливать (бетон)
catch	caught	caught	ловить
choose	chose	chosen	выбирать
cling	clung	clung	цепляться; держаться; прилипать
come	came	come	приходить; приезжать
cost	cost	cost	стоить
creep	crept	crept	ползти; красться
cut	cut	cut	резать
deal	dealt	dealt	иметь дело; рассказывать
dig	dug	dug	копать
do	did	done	делать; исполнять
draw	drew	drawn	чертить; рисовать
dream	dreamt (dreamed)	dreamt (dreamed)	видеть сон; мечтать
drink	drank	drunk	пить

Продолжение табл. П.1.6

drive	drove	driven	водить (машину, автобус); управлять поездом; ехать на машине; доводить кого-либо до чего-либо; вбивать
dwell	dwelt/dwelled	dwelt/dwelled	обитать; жить
eat	ate	eaten	есть
fall	fell	fallen	падать
feed	fed	fed	кормить; есть; питаться
feel	felt	felt	чувствовать
fight	fought	fought	драться; сражаться
find	found	found	находить; обнаруживать
flee	fled	fled	убегать; спасаться бегством
fly	flew	flown	летать
forbid	forbade	forbidden	запрещать
forget	forgot	forgotten	забывать
forgive	forgave	forgiven	прощать
forsake	forsook	forsaken	покидать, бросать (кого-либо); оставлять, бросать (что-либо)
freeze	froze	frozen	замораживать; застывать
get	got	got	достигать; получать
give	gave	given	давать; предоставлять
go	went	gone	ходить; двигаться
grind	ground	ground	измельчать; дробить
grow	grew	grown	расти; увеличиваться
hang	hung	hung	висеть, вешать
have	had	had	иметь
hear	heard	heard	слышать
hide	hid	hidden	прятать; скрывать
hit	hit	hit	ударять
hold	held	held	держать; удерживать; проводить (конференцию)
hurt	hurt	hurt	причинять боль; болеть
keep	kept	kept	хранить
know	knew	known	знать
kneel	knelt/kneeled	knelt/kneeled	стоять на коленях; опускаться на колени
lay	laid	laid	класть; закладывать
lead	led	led	вести; приводить
lean	leant (leaned)	leant (leaned)	откидываться назад; наклоняться вперед; высовываться
learn	learnt (learned)	learnt (learned)	учить(ся); узнавать
leave	left	left	покидать; оставлять
lend	lent	lent	давать займы

Продолжение табл. П.1.6

let	let	let	позволять
lie	lay	lain	лежать
light	lit	lit	зажигать; освещать
lose	lost	lost	терять
make	made	made	делать; заставлять
mean	meant	meant	означать
meet	met	met	встречать(ся); удовлетворять (требованиям)
mow	mowed	mown (mowed)	косить
pay	paid	paid	платить
put	put	put	класть
quit	quit	quit	оставлять; увольняться; бросать; прекращать
read [ri:d]	read [red]	read [red]	читать
ride	rode	ridden	ездить (верхом); ехать (в автобусе, на велосипеде, в поезде)
ring	rang	rung	звонить
rise	rose	risen	вставать; возникать
run	ran	run	бежать; управлять; руководить
saw	sawed	sawn (sawed)	пилить
say	said	said	говорить; сказать
see	saw	seen	видеть; понимать; встречать(ся); посещать
seek	sought	sought	искать; стремиться
sell	sold	sold	продавать
send	sent	sent	посылать; отправлять
set	set	set	устанавливать; заходить (о солнце)
sew	sewed	sewn (sewed)	шить
shake	shook	shaken	трясти; вибрировать
shed	shed	shed	ронять (листья); сбрасывать (кожу); терять (волосы); сокращать; избавляться; лить (слезы)
shine	shone (shined)	shone (shined)	сиять; освещать
shoot	shot	shot	стрелять
show	showed	shown	выявлять; устанавливать; показывать
shrink	shrank	shrunk	показывать
shut	shut	shut	закрывать
sing	sang	sung	петь
sleep	slept	slept	спать
slide	slid	slid	скользить
smell	smelt (smelled)	smelt (smelled)	пахнуть чем-либо; иметь запах; нюхать; чувствовать запах
sow	sowed	sown (sowed)	сеять

Окончание табл. П.1.6

speak	spoke	spoken	говорить; разговаривать
spell	spelt (spelled)	spelt (spelled)	произносить или писать слово по буквам; влечь за собой беду (проблемы)
spend	spent	spent	тратить (деньги); проводить (время)
spill	spilt (spilled)	spilt (spilled)	проливать
spin	spun	spun	крутить(ся); вертеть(ся); прясть
split	split	split	рвать(ся); делить; распределять; раскалывать(ся)
spoil	spoilt (spoiled)	spoilt (spoiled)	портить; баловать
spread	spread	spread	распространять(ся)
speed	ped	ped	превышать скорость
stand	stood	stood	стоять; вставать; не выносить кого-либо (что-либо); выдерживать; терпеть
steal	stole	stolen	красть
sting	stung	stung	жалить; жечь; задевать; уязвлять
stink	stank	stunk	вонять
strike	struck	struck	ударять; бастовать; бить (о часах); открывать месторождение (золота)
swear	swore	sworn	ругаться; клясться
sweep	swept	swept	подметать
swell	swelled	swollen (swelled)	опухать; раздуваться; увеличиваться
swim	swam	swum	плавать, плыть
take	took	taken	брать; носить с собой
teach	taught	taught	учить; преподавать
tear	tore	torn	рвать; разрывать
tell	told	told	говорить; сообщать; рассказывать
think	thought	thought	думать; полагать
throw	threw	thrown	бросать
understand	understood	understood	понимать; заключать
undertake	undertook	undertaken	предпринимать
wake	woke	woken	просыпаться; будить
wear	wore	worn	изнашивать(ся), стирать(ся)
weep	wept	wept	плакать
win	won	won	побеждать; выигрывать; добывать (руду)
wind [waɪnd]	wound [waʊnd]	wound [waʊnd]	заводить (часы), наматывать, виться (о реке, дороге)
wreak	wrought (wreaked)	wrought (wreaked)	наносить вред, ущерб
wring	wrung	wrung	выжимать
write	wrote	written	писать, сочинять

SUPPLEMENTARY READING
Тексты для самостоятельной работы

TEXT 1
Eco-Housing in the UK



Eco-housing, or houses built in accordance with the principles of sustainable development, which use resources and technologies that capitalise on renewability, are a fast-developing industry in the UK. These projects range from individual projects to whole estates, designed to accommodate and create a new community.

Individual or one-off projects, such as yurts, straw-bale houses or dwellings built underground, might reflect the owner or architects unique vision. Where as estates need to incorporate ecological design and ‘green thinking’ into projects and buildings that can appeal to a wider group of people. So how can eco-housing live alongside or even replace traditional housing units and estates in the UK?

Here are 3 examples of the largest ecologically-built projects.

The Bed ZED Project, London

The Bed ZED Project, or Beddington Zero Energy Development, is the UK’s largest carbon-neutral eco-community in the UK. It was built in 2002 in Wallington, Surrey, Within the London Borough of Sutton, and comprises of 82 residential homes. The Project was developed by the Peabody Trust, a social housing initiative in London, that aims to fight poverty within the capital. The intention with this project, built in partnership with both an architect and an environmental consultancy firm, was to create a housing project that incorporates new approaches to energy conservation and sustainability, and also to build a thriving community to live within it.

The houses are equipped with key features, both technological and common sense – for example, designed in south facing terraces to maximise solar heat gain, that utilise renewable, and conservable, energy. A small-scale combined heat and power plant on site, powered by wood off-cuts, provides most of the energy to the estate. All buildings have a thick insulation jacket, made from recycled materials. The project has a legally-binding green transport plan, incorporating a car pool system for residents, great public transport links, and is linked in to a cycling network. For these, and many more social and environmental initiatives and technologies, Bed ZED has won many national and International awards for sustainability, design, Innovation and more. It is an inspiring achievement on a local and social level.

Slateford Green Housing, Edinburgh

A second public housing eco-project is the Slateford Green Estate, in Edinburgh. The project, consisting of 120 homes, was developed by a housing association together with the Scottish housing agency, in 2000, at a cost of £9.5 million.

It is a car-free estate, with the space that parking would have consumed, instead being used for gardens, allotments and a large children's play area, around a large central pond with environment-friendly reed beds. The reed beds filter the quality of surface and storm water. This artificial wetland area has been planted with native, low maintenance species, chosen to encourage wildlife. Some of the features in the houses include insulation from recycled newspapers, photovoltaic, a recyclable aluminium roof, and a breathing wall membrane, layered upon an engineered timber structure.

The Findhorn Foundation Eco-Village, Forres

On Scotland's north-east coast, near the town of Forres, is the Findhorn Foundation, an intentional community, based upon the values of spirituality and sustainable living. Part of its project is an eco-village, which consists of 45 ecologically-built buildings (so far, although the vision is much more). They have developed a unique construction system that is energy efficient and environmentally sound. All the buildings features are ecological innovations. Some of the original buildings are reconstructed whiskey barrels, bought from nearby distilleries; and there are also later-built straw bale houses and earth ships, which use recycled car tyres.

It is a wonderful place, well worth a visit, and the ecovillage project is a tremendous resource or education and information about building 'green'.

These 3 examples are just the larger examples of eco-building in the UK. It is important to understand how these examples have placed both the concept of building with sustainable resources, and creating a vibrant human community at the core of their philosophy. These 2 parts form the central structure of the principle of sustainable development – for now, and for future generations.

Answer the following questions.

1. What are the largest ecologically-built projects in the UK?
2. What is Slateford Green Housing?

TEXT 2

Top Eco / Green Buildings in UK

An increasing population requiring more homes and more buildings for businesses is a challenge in a world where sustainability attempts to combat climate change. Eco or green building is considered the best way forward, with buildings powered by renewable energy combined with a reduction of waste at home and at work. Through the use of on-site water treatment plants and recycling facilities UK

architects continue to create green buildings as an investment in future generations and the health of the planet.

Here we list the best UK eco/green buildings that avoid a negative impact on the environment.

One Embankment Place, London

Considered the most environmentally friendly building in London, the Price-waterhouseCoopers building is the UK's best "air rights" building, constructed on top of an existing structure, built over Charing Cross Station in the early 1990's.

New technologies include a tri-generation combined cooling, heat and power system. This is fuelled by recycled waste vegetable oil that is collected and refined locally to a new efficiency standard by Uptown Oil and South Bank University. Chiller beams replace air conditioning and low-power lift braking has been installed, along with eco-friendly carpet tiles and electrical charging points. Open plan spaces and airy atria provide natural light; roof gardens and green walls contribute to the building's ecology; and waterless urinals and low flush toilets reduce water use. During the work, ninety-five percent of materials were sourced responsibly and ninety-six percent of construction waste was diverted from landfill.

The result is a building with Environmental Performance Certificate A and a BREEAM score of 96.31 percent, one of the best in the world. The refurbishment is expected to pay for itself in less than four years and the company states the transformation will help it achieve PwC's 2017 targets to reduce carbon emissions by fifty percent and energy use by twenty-five percent.

Dalby Forest Visitor Centre, North Yorkshire



Winner of the 2007 Better Public Building Award, this North Yorkshire structure makes full use of the environment around it. The forest next door supplies wood chips to power the boiler and is also where the wood used to clad the building came from. Photovoltaic panels and a micro wind turbine supply the electricity. Even the toilets are flushed with rainwater gathered on the roof and stored in a tank, reducing the amount of water taken

from the village well. What's more, the whole building can be entirely recycled at the end of its life.

The Foundry, London

This former shoe-polish factory was adapted to become an office facility that houses various charities in London. Built on a former brownfield in Vauxhall, this adaptive reuse project sports a zigzagging and glazed façade that allows generous amounts of natural light into the building. The architects retained many of the architectural elements

of the former factory building, a strategy that not only preserved the area's traditional character, but also had cost-effective and environmentally friendly benefits.

NEO Bankside, London

NEO Bankside is a mixed-use development that overlooks enviable views of the adjacent River Thames and is close to Tate Modern. The 217-unit complex comprises four hexagonal residential blocks. The structures are supported by external bracing system that remove the need for interior load-bearing walls and allow the architects to maximize natural light and views. The scheme incorporates a number of the best sustainable features including a combined heating and power plant; ground source heat pumps for central heating in winter and cooling in summer and solar water heating from roof panels. Collectively, these three systems provide a proportion of the domestic hot water and space heating requirements of each apartment. Harvested rainwater is used for irrigating the landscaped areas.

WWF-UK Headquarters Living Planet Centre, Woking

The WWF-UK's Living Planet Centre is another UK building that has been awarded the BREEAM "Outstanding" building award. The building minimizes its environmental impact and educates the public on its many sustainable features. The solar-powered project was built on a former brownfield and its design includes passive solar principles, recycled construction materials, energy-efficient appliances, rainwater catchment systems, plus easy access to public transit.

Brentford Lock West, London

This residential development on the banks of the Grand Union Canal was developed for the ISIS Waterside Regeneration project. The 45 energy-efficient residential units are clad in brick and sculpted with jagged roof-lines in keeping with the area's industrial character. This UK project won a biodiversity award for its landscape design, irrigated by harvested rainwater. This not only increases the site's ecological value, but also helps the brownfield soil regeneration. Solar energy powers the buildings, which are heated from communal gas boilers and retain the heat using high performance insulation and windows.

Bloomberg HQ, London



Located in London, the new 10-storey eco-building – considered the world's most sustainable office building – achieved the highest-ever Building Research Establishment Environmental Assessment Method (BREEAM) score for office buildings, earning a 98.5% rating based on the global sustainability standard. The exceptionally green project acquired this, in part, by utilising traditional sustainability solutions, such as a greywater collection system on the roof and vacuum-drainage toilets that

dramatically reduce water usage. The most eye-catching energy-saving feature of the headquarters though, is approximately 4,000 integrated ceiling panels that combine heating, cooling, lighting, and acoustic functions. Half a million LED lights are embedded into the bespoke panels and use 40% less energy than a typical fluorescent office lighting system.

Answer the following questions.

1. Why is it important to erect “green buildings” in the contemporary world?
2. What eco-buildings in the UK can you name?

TEXT 3

The influence of environmental impact on new building materials

Developers of new building materials are now very conscious of their environmental implications, which is why recycled materials are becoming more and more widely used.

Materials that would otherwise be burnt or end up in land-fill are being turned into insulation, or reduced to pellets for use in making other materials such as cement.

For example, in Argentina, scientists created ‘ecological bricks’, which are made out of recycled candy wrappers and plastic drink bottles mixed with cement. With half the weight and half the cost of traditional bricks, they still have comparable insulation properties and are just as strong, durable and water and fire-resistant.

Composite materials are also playing more of a role in today’s buildings. These lightweight and durable materials are made by combining organic and inorganic components, with one component providing the adhesive quality that binds the whole together. They can be moulded into a variety of pre-shaped building components.

Researchers often look to nature for inspiration. In the UK, a ceramic polymer was created by combining calcite crystals (chalk) with polystyrene particles. The material was created after studying the composition of sea shells. It is more energy-absorbing and durable than chalk, and led to a new range of building materials.

Self-healing cement is another building material innovation from this century. When cracks appear in cement, a previously embedded capsule ruptures and a sodium silicate healing agent is released. This reacts with the cement and forms a gel which repairs the cracks. Similar methods are being trialled with metals to repair cracks and corrosion.

Other examples of innovative building materials include:

- Foam insulation pumped into roofs and walls;
- Liquid granite (same load bearing capacity as cement, but with only one third the cement);

- Fibre-reinforced bendable concrete (500 times more resistant to cracking);
- Richlite benchtops (recycled paper treated with resin and baked into solid sheets);
- Translucent concrete (cement mixed with glass-fibre strands).

Modern building materials are becoming more lightweight, cost-effective, durable, energy-efficient and resistant to extreme weather and termites.

And while the overall trend in modern building materials is towards environmental sustainability, the new innovations also offer new opportunities in design.

Answer the following questions.

1. What are «ecological bricks» made out of?
2. What are the examples of innovative building materials?

CONSTRUCTION GLOSSARY
Строительный глоссарий

A/C – An abbreviation for air conditioner or air conditioning (кондиционирование воздуха или кондиционер воздуха).

Aggloporite – An artificial porous aggregate for concrete in the form of crushed stone or gravel (аглопорит).

Aggregate – Material used for mixing with cement, bitumen, lime, gypsum, or other adhesive to form concrete or mortar (заполнитель).

Air space – The area between insulation facing and interior of exterior wall coverings. Normally a 1" air gap (воздушное пространство).

Alabaster – A mineral or rock that is soft, often used for carving, and is processed for plaster powder (алебастр).

Anchor bolts – Bolts to secure a wooden sill plate to concrete, or masonry floor or wall (анкеры, анкерные болты).

Appraisal – An expert valuation of property (оценка стоимости имущества).

Architect – One who has completed a course of study in building and design, and is licensed by the state as an architect. One who draws up plans (архитектор).

Astragal – A molding, attached to one of a pair of swinging double doors, against which the other door strikes (астрал).

Attic access – An opening that is placed in the drywalled ceiling of a home providing access to the attic (вход на чердак).

Attic Ventilators – In houses, screened openings provided to ventilate an attic space (вентилятор чердака).

Backfill – The replacement of excavated earth into a trench around or against a basement /crawl space foundation wall (засыпка канавы).

Balusters – Vertical members in a railing used between a top rail and bottom rail or the stair treads. Sometimes referred to as 'pickets' or 'spindles' (белясины).

Balustrade – The rail, posts and vertical balusters along the edge of a stairway or elevated walkway (балюстрада).

Base or baseboard – A trim board placed against the wall around the room next to the floor (плинтус).

Base shoe – Molding used next to the floor on interior base board. Sometimes called a carpet strip (калевка у нижней кромки плинтуса).

Beam – A long piece of wood or metal, used to support a weight above (балка).

Bearing partition – A partition that supports any vertical load in addition to its own weight (несущая перегородка).

Bearing point – A point where a bearing or structural weight is concentrated and transferred to the foundation (точка приложения нагрузки).

Bearing wall – A wall that supports any vertical load in addition to its own weight (несущая стена).

Bedrock – A subsurface layer of earth that is suitable to support a structure (подстилающий грунт).

Bifold door – Doors that are hinged in the middle for opening in a smaller area than standard swing doors. Often used for closet doors (двустворчатая дверь).

Brace – An inclined piece of framing lumber applied to wall or floor to strengthen the structure. Often used on walls as temporary bracing until framing has been completed (соединительная балка, подпора).

Bracket - A piece of wood, metal or plastic fixed to the wall to support a shelf, lamp, etc. (кронштейн).

Brick ledge – Part of the foundation wall where brick (veneer) will rest (кирпичный выступ на стене).

Bridging – Small wood or metal members that are inserted in a diagonal position between the floor joists or rafters at mid-span for the purpose of bracing the joists/rafters & spreading the load (распорки между балками перекрытия).

Building codes – Community ordinances governing the manner in which a home may be constructed or modified (строительные нормы).

Built-up roof – A roofing composed of three to five layers of asphalt felt laminated with coal tar, pitch, or asphalt. The top is finished with crushed slag or gravel. Generally used on flat or low-pitched roofs (совмещенная крыша, бесчердачная крыша).

Bungalow – A house built all on one level, without stairs (бунгало, одноэтажный дом).

Butt joint – The junction where the ends of two timbers meet, and also where sheets of drywall meet on the 4 foot edge. To place materials end-to-end or end-to-edge without overlapping (стыковое соединение, стыковое сварное соединение, стыковать).

Buttress – An architectural structure built against or projecting from a wall which serves to support or reinforce the wall (контрфорс).

Caisson – boxlike structure used in construction work underwater or as a foundation. It is usually rectangular or circular in plan and may be tens of metres in diameter (кессон).

Casement – Frames of wood or metal enclosing part (or all) of a window sash. May be opened by means of hinges affixed to the vertical edges (створка оконного переплета).

Casing – Wood trim molding installed around a door or window opening (крепление).

Caulking – (1) A flexible material used to seal a gap between two surfaces e.g. between pieces of siding or the corners in tub walls. (2) To fill a joint with mastic or asphalt plastic cement to prevent leaks (герметизировать).

Ceiling joist – One of a series of parallel framing members used to support ceiling loads and supported in turn by larger beams, girders or bearing walls. Also called roof joists (потолочная балка).

Cement clinker – A solid material produced in the manufacture of Portland cement as an intermediary product. Clinker occurs as lumps or nodules, usually 3 mil-

limetres (0.12 in) to 25 millimetres (0.98 in) in diameter. It is produced by sintering (fusing together without melting to the point of liquefaction) limestone and aluminosilicate materials such as clay during the cement kiln stage (цементный клинкер).

Ceramic tile – A man-made or machine-made clay tile used to finish a floor or wall. Generally used in bathtub and shower enclosures and on counter tops (керамическая плитка).

CFM (cubic feet per minute) – A rating that expresses the amount of air a blower or fan can move. The volume of air (measured in cubic feet) that can pass through an opening in one minute (кубический фут в минуту).

Chair rail – Interior trim material installed about 3-4 feet up the wall, horizontally (рейка для защиты стен от повреждения спинками стульев, часто является декоративным элементом интерьера).

Chalk line – A line made by snapping a taut string or cord dusted with chalk. Used for alignment purposes (меленый шнур).

Chipboard – A manufactured wood panel made out of 1"- 2" wood chips and glue. Often used as a substitute for plywood in the exterior wall and roof sheathing. Also known as **particle board**. (древесно-стружечная плита, ДСтП или ДСП).

Collar – Preformed flange placed over a vent pipe to seal the roofing above the vent pipe opening. Also called a vent sleeve (стропильная затяжка).

Column – A vertical structural compression member which supports loads (колонна).

Composite material – A combination of two materials with different physical and chemical properties. Typical engineered composite materials include reinforced concrete and masonry, composite wood such as plywood, reinforced plastics, such as fiber-reinforced polymer or fiberglass, ceramic matrix composites, metal matrix composites, etc. (композитный, составной материал).

Concrete block – A hollow concrete 'brick' often 8" x 8" x 16" in size (бетонный блок).

Concrete slab – A common structural element of modern buildings, consisting of a flat, horizontal surface made of cast concrete (бетонная плита).

Condensing unit – The outdoor component of a cooling system. It includes a compressor and condensing coil designed to give off heat (конденсаторный блок).

Conditions, Covenants, and Restrictions (CC and Rs) – The standards that define how a property may be used and the protections the developer makes for the benefit of all owners in a subdivision (права и обязанности ассоциации домовладельцев).

Continuity tester – A device that tells whether a circuit is capable of carrying electricity (прибор для контроля целостности изоляции проводов, тестер для проверки цепей на разрыв).

Coped joint – Cutting and fitting woodwork to an irregular surface (перекрытый шов).

Cross-laminated timber (CLT) – (A sub-category of engineered wood) A wood panel product made from gluing together layers of solid-sawn lumber, i.e., lumber cut from a single log (многослойные клееные деревянные панели).

Crown molding – A molding used on cornice or wherever an interior angle is to be covered, especially at the roof and wall corner (лепнина под потолком, потолочный плинтус, поясok над карнизом).

Damper – A metal «door» placed within the fireplace chimney. Normally closed when the fireplace is not in use (заслонка дымохода).

Damp-proof course – A layer of waterproof material which is put into the bottom of the outside wall of a building to prevent moisture from rising (гидроизоляционный слой).

Damp-proofing – The black, tar like waterproofing material applied to the exterior of a foundation wall (гидроизоляция).

Dead bolt – An exterior security lock installed on exterior entry doors that can be activated only with a key or thumb-turn. Unlike a latch, which has a beveled tongue, dead bolts have square ends (дверной засов, открываемый ключом; замок с ригелем).

Deck, decked – To install the plywood or wafer board sheathing on the floor joists, rafters, or trusses (настилать).

Deep foundation – A type of foundation that transfers building loads to the earth farther down from the surface than a shallow foundation does to a subsurface layer or a range of depths (фундамент глубокого заложения).

Door stop – The wooden style that the door slab will rest upon when it's in a closed position (ограничитель двери).

Double glass – Window or door in which two panes of glass are used with a sealed air space between. Also known as **insulating glass** (двойное стекло, изоляционное стекло).

Double hung window – A window with two vertically sliding sashes, both of which can move up and down (окно с двумя подъёмно-опускными створками).

Downspout – A pipe, usually of metal, for carrying rainwater down from the roof's horizontal gutters (водосточная труба).

Drain tile – A perforated, corrugated plastic pipe laid at the bottom of the foundation wall and used to drain excess water away from the foundation. It prevents ground water from seeping through the foundation wall. Sometimes called perimeter drain (дренажная труба, керамическая дренажная труба).

Drip cap – A molding or metal flashing placed on the exterior topside of a door or window frame to cause water to drip beyond the outside of the frame (водосток).

Drywall (or Gypsum Wallboard (GWB), Sheet rock or Plasterboard) – A manufactured panel made out of gypsum plaster and encased in a thin cardboard. Usually 1/2" thick and 4' x 8' or 4' x 12' in size. The panels are nailed or screwed onto the framing and the joints are taped and covered with a «joint compound». «Green board» type drywall has a greater resistance to moisture than regular (white) plasterboard and is used in bathrooms and other "wet areas". See also Gypsum board (гипсокартон).

DWV (drain-waste-vent) – The section of a plumbing system that carries water and sewer gases out of a home (дренажные, сливные и вентиляционные трубы).

Eave – The lower border of a roof that overhangs the wall. Also known as Cornice (карниз).

Elbow (ell) – A plumbing or electrical fitting that lets you change directions in runs of pipe or conduit (отвод с резким изменением направления потока).

Engineered wood (also called **mass timber**, **composite wood**, **man-made wood**, or **manufactured board**) – Wood which includes a range of derivative wood products which are manufactured by binding or fixing the strands, particles, fibres, or veneers or boards of wood, together with adhesives, or other methods of fixation to form composite material (инженерная древесина).

Evaporator coil – The part of a cooling system that absorbs heat from air in your home (змеевик конденсатора).

Expansion joint – Fibrous material installed in and around a concrete slab to permit it to move up and down (seasonally) along the non-moving foundation wall (деформационный шов).

Expansive soils – Earth that swells and contracts depending on the amount of water that is present (разбухаемый грунт)

Exposed aggregate finish – A method of finishing concrete which washes the cement/sand mixture off the top layer of the aggregate – usually gravel. Often used in driveways, patios and other exterior surfaces (фактурная отделка бетонных поверхностей методом обнажения зёрен крупного заполнителя).

Face nail – Nail installed into the vertical face of a bearing header or beam (гвоздь, забиваемый со стороны лицевой грани деревянной обшивки).

Facing brick – The brick used and exposed on the outside of a wall. Usually these have a finished texture (облицовочный кирпич).

Fibreglass (US English fiberglass) – Fibrous form of glass that is used principally as insulation and as a reinforcing agent in plastics (стекловолокно).

Finger joint – A manufacturing process of interlocking two shorter pieces of wood end to end to create a longer piece of dimensional lumber or molding. Often used in jambs and casings and are normally painted (instead of stained) (зубчатое клеевое соединение, зубчатое соединение для сращивания деревянных деталей по длине, зубчатое соединение для сращивания досок по длине).

Fire brick – Brick made of refractory ceramic material which will resist high temperatures. Used in a fireplace and boiler (огнеупорный кирпич).

Fire-resistive or Fire rated – Applies to materials that are not combustible in the temperatures of ordinary fires and will withstand such fires for at least 1 hour (огнестойкий).

Fire retardant chemical – A chemical or preparation of chemicals used to reduce the flammability of a material or to retard the spread of flame (химический препарат, задерживающий воспламенение и замедляющий распространение огня).

Firestop – A solid, tight closure of a concealed space, placed to prevent the spread of fire and smoke through such a space. In a frame wall, this will usually consist of 2 by 4 cross blocking between studs. Work performed to slow the spread of fire and smoke in the walls and ceiling (behind the drywall). Includes stuffing wire holes in the top and bottom plates with insulation, and installing blocks of wood between the wall studs at the drop soffit line. This is integral to passing a Rough Frame inspection (противопожарная защита).

Flagstone (flagging or flags) – Flat stones (1 to 4 inches thick) used for walks, steps, floors, and vertical veneer (in lieu of brick) (камень-плитняк, каменная плита).

Flashing – Sheet metal or other material used in roof and wall construction to protect a building from water seepage (гидроизолирующая прокладка).

Flatwork – Common word for concrete floors, driveways, basements, and sidewalks (плоскостные сооружения).

Float glass – A sheet of glass made by floating molten glass on a bed of molten metal, typically tin, although lead and other various low-melting-point alloys were used in the past. This method gives the sheet uniform thickness and very flat surfaces (термополированное стекло, флоат-стекло, наплавное стекло).

Floating – The next-to-last stage in concrete work, when you smooth off the job and bring water to the surface by using a hand float or bull float (затирка штукатурки, выравнивание поверхности).

Floating wall – A non-bearing wall built on a concrete floor. It is constructed so that the bottom two horizontal plates can compress or pull apart if the concrete floor moves up or down. Normally built on basements and garage slabs (плавающая стена).

Form – Temporary structure erected to contain concrete during placing and initial hardening (опалубочная форма).

Formwork – Mold used to form concrete into structural shapes (beams, columns, slabs, shells) for building. It can be of timber, steel, plastic, or fiberglass (опалубка).

Foundation – The supporting portion of a structure below the first floor construction, or below grade, including the footings (фундамент).

Foundation waterproofing – High-quality below-grade moisture protection. Used for below-grade exterior concrete and masonry wall damp-proofing to seal out moisture and prevent corrosion. Normally looks like black tar (гидроизоляция фундамента).

Furring strips – Strips of wood, often 1 x 2 and used to shim out and provide a level fastening surface for a wall or ceiling (рейки для обрешетки стен под штукатурку, дранка).

Gable – The end, upper, triangular area of a home, beneath the roof (щипец).

General Contractor – A contractor who enters into a contract with the owner of a project for the construction of the project and who takes full responsibility for its completion, although the contractor may enter into subcontracts with others for the performance of specific parts or phases of the project (генеральный подрядчик).

Girder – A strong steel or iron support beam used in the framework of buildings and bridges (опорная балка, несущая балка, главная балка, стальная или железная).

Glazing – The process of installing glass, which commonly is secured with glazier's points and glazing compound (остекление).

Gloss enamel – A finishing paint material. Forms a hard coating with maximum smoothness of surface and dries to a sheen or luster (gloss) (глянцевая эмаль).

Glued Laminated Beam (Glulam) – A structural beam composed of wood laminations or lams. The lams are pressure bonded with adhesives to attain a typical thickness of 1 ½". (It looks like 5 or more 2 x 4's are glued together) (клееный брус).

Grade – Ground level, or the elevation at any given point. Also the work of leveling dirt. Also the designated quality of a manufactured piece of wood (категория).

Grade beam – A foundation wall that is poured level with or just below the grade of the earth. An example is the area where the 8' or 16' overhead garage door «block out» is located, or a lower (walk out basement) foundation wall is poured (фундаментная балка; рандбалка).

Grasscrete – Reinforced cellular cast on site concrete within which you can either grow natural grass or fill its cavities with gravel (травобетон).

Greywater – The waste water produced from baths, showers, clothes washers, and wash-hand basins (бытовые сточные воды).

Grid – The completed assembly of main and cross tees in a suspended ceiling system before the ceiling panels are installed (металлоконструкция).

Groundwater – Water from an aquifer or subsurface water source (грунтовая вода, подземные воды).

Grout – A wet mixture of cement, sand and water that flows into masonry or ceramic crevices to seal the cracks between the different pieces. Mortar made of such consistency (by adding water) that it will flow into the joints and cavities of the masonry work and fill them solid (подливочный раствор на основе цемента).

Gusset – A flat wood, plywood, or similar type member used to provide a connection at the intersection of wood members. Most commonly used at joints of wood trusses. They are fastened by nails, screws, bolts, or adhesives (скоба, усилительная накладка).

Gutter – A shallow channel or conduit of metal or wood set below and along the (fascia) eaves of a house to catch and carry off rainwater from the roof (ливневый сток, водослив).

Gypsum board – One of the widely used constructive materials mainly in interior designing works (гипсокартон).

Gypsum plaster – Gypsum formulated to be used with the addition of sand and water for base-coat plaster (гипсовая штукатурка).

Half-bat – One half of a brick (полкирпича).

Hardware – All of the «metal» fittings that go into the home when it is near completion. For example, door knobs, towel bars, handrail brackets, closet rods, house numbers, door closers, etc. The Interior Trim Carpenter installs the «hardware» (металлические изделия, скобяные товары).

Heating load – The amount of heating required to keep a building at a specified temperature during the winter, usually 65°F, regardless of outside temperature (отопительная нагрузка).

Hempcrete – A building material formed from the inner fibres of hemp plants. The hemp fibres are treated with lime to create concrete-like shapes which are not only durable but super lightweight (костробетон).

Hip roof – A roof that rises by inclined planes from all four sides of a building (вальмовая крыша).

Hurricane clips – Metal straps that are nailed and secure the roof rafters and trusses to the top horizontal wall plate. Sometimes called a Teco clip (специальные приспособления).

собления, которые дополнительно скрепляют нижний ряд черепицы с кровлей).

H V A C – An abbreviation for **H**eating, **V**entilation, and **A**ir **C**onditioning (ОВиК, отопление, вентиляция и кондиционирование).

Hydration – The adding of water molecules to a chemical substance (гидратация, присоединение воды).

I-beam – A steel beam with a cross section resembling the letter **I**. It is used for long spans as basement beams or over wide wall openings, such as a double garage door, when wall and roof loads bear down on the opening (двутавр, двутавровая балка).

Indentation hardness – A material's ability to resist indentations – that is, compressions in the surface of a material caused by impacts (твердость по Роквеллу, твердость, определяемая методом вдавливания).

Inside corner – The point at which two walls form an internal angle, as in the corner of a room (внутренний угол).

Insulating glass – Window or door in which two panes of glass are used with a sealed air space between. Also known as **double glass** (изоляционное стекло, двойное стекло).

Insulation board, rigid – A structural building board made of coarse wood or cane fiber in 1/2- and 25/32-inch thickness. It can be obtained in various size sheets and densities (звукоизоляционная плита).

Insulation – Any material high in resistance to heat transmission that, when placed in the walls, ceiling, or floors of a structure, and will reduce the rate of heat flow (изоляционный материал).

Interior finish – Material used to cover the interior framed areas of walls and ceilings (внутренняя отделка, материалы для внутренней отделки).

Isolated footing – A square, rectangular, or circular slab that supports the structural members individually. Generally, each of its columns gets its footing to transmit and distribute the load of the structure towards the soil underneath. Sometimes, an isolated footing can be sloped or stepped at the base to spread greater loads. This type of footing is used when the structural load is relatively low, columns are widely spaced, and the soil's bearing capacity is adequate at a shallow depth. Also known as **single-column footing** (столбчатый фундамент).

Joint – The location between the touching surfaces of two members or components joined and held together by nails, glue, cement, mortar, or other means (стык, шов, область соединения).

Joint cement or Joint compound – A powder that is usually mixed with water and used for joint treatment in gypsum-wallboard finish. Often called «spackle» or dry-wall mud (заливочная мастика).

Laminated glass – Safety glass in which a transparent plastic film is placed between plates of glass (триплекс).

Laminated shingles – Shingles that have added dimensionality because of extra layers or tabs, giving a shake-like appearance. May also be called «architectural shingles» or «three-dimensional shingles» (ламинированная черепица, архитектурная черепица, объемная кровля, трехслойная черепица).

Laminated veneer lumber (LVL) – An engineered wood product that uses multiple layers of thin wood assembled with adhesives. It is typically used for headers, beams, rimboard, and edge-forming material. LVL offers several advantages over typical milled lumber: Made in a factory under controlled specifications, it is stronger, straighter, and more uniform. Due to its composite nature, it is much less likely than conventional lumber to warp, twist, bow, or shrink. LVL is a type of structural composite lumber, comparable to glued laminated timber (glulam) but with a higher allowable stress. Also known as **Microllam** (клееный брус из шпона, ЛВЛ-брус).

Laminating – Bonding together two or more layers of materials (ламинирование, совместное прессование различных материалов для получения слоистой структуры).

Landing – A platform between flights of stairs or at the termination of a flight of stairs. Often used when stairs change direction. Normally no less than 3 ft. x 3 ft. square (лестничная площадка).

Lath – A building material of narrow wood, metal, gypsum, or insulating board that is fastened to the frame of a building to act as a base for plaster, shingles, or tiles (обрешетка).

Lattice – An open framework of criss-crossed wood or metal strips that form regular, patterned spaces (решетка, решетка фермы).

Lintel – A horizontal structural member that supports the load over an opening such as a door or window (перемычка, архитрав).

Load bearing wall – Includes all exterior walls and any interior wall that is aligned above a support beam or girder. Normally, any wall that has a double horizontal top plate (опорная стена, несущая стена).

Low Heat Cement - A special tailored cement which generates low heat of hydration during setting. It is manufactured by modifying the chemical composition of normal Portland cement (цемент с малой экзотермией).

Masonry – Stone, brick, concrete, hollow-tile, concrete block, or other similar building units or materials. Normally bonded together with mortar to form a wall (каменная кладка).

Mastic – A pasty material used as a cement (as for setting tile) or a protective coating (as for thermal insulation or waterproofing) (мастика).

Medium-density fibreboard or MDF – An engineered wood product made by breaking down hardwood or softwood residuals into wood fibres, often in a defibrator, combining it with wax and a resin binder, and forming it into panels by applying high temperature and pressure (древесноволокнистая плита средней плотности, МДФ).

Metal fatigue – A weakening of metal due to stress, resulting in an accumulation of small cracks (усталость металла).

Mica – Common in igneous and metamorphic rock and is occasionally found as small flakes in sedimentary rock (слюда).

Microllam – A brand name for Laminated Veneer Lumber (LVL) Beams manufactured by Weyerhaeuser. Microllam is a manufactured structural wood beam. It is constructed of pressure and adhesive bonded wood strands of wood. Microllams have a higher strength rating than solid sawn lumber. Normally come in 1 ½" thickness' and

9 ½", 11 ½" and 14" widths. Also known as **Laminated veneer lumber (LVL)** (клееный брус из шпона, ЛВЛ-брус).

Molding – A wood strip having an engraved, decorative surface (архитектурный профиль).

Mortar – A mixture of sand, water, and cement or lime which is put between bricks to hold them together (строительный раствор).

Mortise – A slot cut into a board, plank, or timber, usually edgewise, to receive the tenon (or tongue) of another board, plank, or timber to form a joint (выемка, вырез, гнездо, паз, прорезь).

Muntin – A small member which divides the glass or openings of sash or doors (горбылек, средник).

Nonbearing wall – A wall supporting no load other than its own weight (ненесущая стена).

Oriented Strand Board or OSB – A manufactured 4' X 8' wood panel made out of 1"-2" wood chips and glue. Often used as a substitute for plywood (ориентированно-стружечная плита, ОСП).

Outrigger – An extension of a rafter beyond the wall line. Usually a smaller member nailed to a larger rafter to form a cornice or roof overhang (опора).

Outside corner – The point at which two walls form an external angle, one you usually can walk around (внешний угол).

Paint – A combination of pigments with suitable thinners or oils to provide decorative and protective coatings. Can be oil based or latex water based (краска).

Panel – A thin flat piece of wood, plywood, or similar material, framed by stiles and rails as in a door (or cabinet door), or fitted into grooves of thicker material with molded edges for decorative wall treatment (панель).

Parapet – A wall placed at the edge of a roof to prevent people from falling off (парапет).

Particle board - A hard material made out of very small pieces of wood which have been pressed together. It is often used for making doors and furniture. Also known as **chipboard** (древесно-стружечная плита, ДСтП или ДСП).

Parting stop or strip – A small wood piece used in the side and head jambs of double hung windows to separate the upper sash from the lower sash (брусочек).

Partition – A wall that subdivides spaces within any storey of a building or room (перегородка).

Paver, paving – Materials — commonly masonry — laid down to make a firm, even surface (материал для мощения, камень, кирпич и т.п. для мощения).

Perlite – An amorphous volcanic glass that has a relatively high water content, typically formed by the hydration of obsidian. It occurs naturally and has the unusual property of greatly expanding when heated sufficiently (перлит).

Pier – A column of masonry, usually rectangular in horizontal cross section, used to support other structural members (пилястра).

Pigment – A powdered solid used in paint or enamel to give it a color (пигмент, краситель в краске, лаке).

Pitch – The incline slope of a roof or the ratio of the total rise to the total width of a house, i.e., a 6-foot rise and 24-foot width is a one-fourth pitch roof. Roof slope is expressed in the inches of rise, per foot of horizontal run (скат крыши).

Ply – A term to denote the number of layers of roofing felt, veneer in plywood, or layers in built-up materials, in any finished piece of such material (слой шпона).

Plyscrapper – A skyscraper made (at least partly) of wood (небоскреб из фанеры).

Plywood – A panel (normally 4' X 8') of wood made of three or more layers of veneer, compressed and joined with glue, and usually laid with the grain of adjoining plies at right angles to give the sheet strength (фанера).

Point load – A point where a bearing/structural weight is concentrated and transferred to the foundation (точечная нагрузка).

Polycarbonates (PC) – A group of thermoplastic polymers containing carbonate groups in their chemical structures (поликарбонаты).

Polyvinyl chloride (PVC) – The world's third-most widely produced synthetic plastic polymer. It is manufactured by bulk, solution, suspension, and emulsion polymerization of vinyl chloride monomer, using free-radical initiators (поливинилхлорид, ПВХ).

Portland cement – Cement made by heating clay and crushed limestone into a brick and then grinding to a pulverized powder state (портландцемент).

Post – A vertical framing member usually designed to carry a beam. Often a 4" x 4", a 6" x 6", or a metal pipe with a flat plate on top and bottom (стойка).

Post-and-beam – A basic building method that uses just a few hefty posts and beams to support an entire structure. Contrasts with stud framing (каркасная конструкция).

Post-and-lintel system – A system in which two upright members, the posts, hold up a third member, the lintel, laid horizontally across their top surfaces. Ancient Egyptian and Ancient Greek architecture was of this type, using stone. (стоечно-балочная система).

Pozzolan – A very finely ground pumice or fly ash. The specific gravity of pozzolan is only slightly less than cement (пуццолан).

Pressure-treated wood – Lumber that has been saturated with a preservative (древесина, обработанная консервантами под давлением).

Quarry tile – A man-made or machine-made clay tile used to finish a floor or wall. Generally 6" x 6" x 1/4" thick (квадратная керамическая плитка для покрытий).

Quarter round – A small trim molding that has the cross section of a quarter circle (четвертной вал).

Rafter – Lumber used to support the roof sheathing and roof loads. Generally, 2 x 10's and 2 x 12's are used. The rafters of a flat roof are sometimes called roof joists (стропило).

Raft foundation – A single continuous slab that covers the entirety of the base of a building. Mat foundations support all the loads of the structure and transmit them to the ground evenly. Soil conditions may prevent other footings from being used. Since this type of foundation distributes the load coming from the building uniformly over a considerably large area, it is favoured when individual footings are unfeasible

due to the low bearing capacity of the soil (плитный фундамент).

Ready mixed concrete – Concrete mixed at a plant or in trucks en route to a job and delivered ready for placement (бетонная смесь, приготовленная на заводе).

Rebar, reinforcing bar – Ribbed steel bars installed in foundation concrete walls, footers, and poured in place concrete structures designed to strengthen concrete. Comes in various thickness' and strength grade (арматурный стержень, арматура железобетона).

Reflective insulation- Sheet material with one or both faces covered with aluminum foil (отражающая теплоизоляция).

Reinforced concrete - Concrete that is made with pieces of metal inside it to make it stronger (железобетон).

Ribbon (girt) – Normally a 1 x 4 board let into the studs horizontally to support the ceiling or second-floor joists (деревянная балка перекрытия).

Ridge – The horizontal line at the junction of the top edges of two sloping roof surfaces (гребень).

Road base – An aggregate mixture of sand and stone (дорожное основание).

Roll roofing – Asphalt roofing products manufactured in roll form. 36-inch wide rolls with and 108 square feet of material. Weights are generally 45 to 90 pounds per roll (рулонное кровельное покрытие).

Roof sheathing or sheeting – The wood panels or sheet material fastened to the roof rafters or trusses on which the shingle or other roof covering is laid (настил крыши).

Safety glass – Glass with additional safety features that make it less likely to break, or less likely to pose a threat when broken (безосколочное стекло).

Sand-lime brick – a hard brick composed of silica sand and a lime of high calcium content, molded under high pressure and baked (силикатный кирпич).

Sash – A single light frame containing one or more lights of glass. The frame that holds the glass in a window, often the movable part of the window (оконный переплет, оконная рама, скользящая рама в подъемном окне).

Sash balance – A device, usually operated by a spring and designed to hold a single hung window vent up and in place (противовес раздвижного оконного переплета, пружинный механизм подъемного окна).

Saturated felt – A felt which is impregnated with tar or asphalt (толь, кровельный толевый, рубероидный картон-основа, пропитанный битумом войлок).

Scratch hardness – A material's ability to resist being scratched (твердость по Моосу, твердость царапанием, твердость, определяемая методом царапания).

Screed, concrete – To level off concrete to the correct elevation during a concrete pour (выравнивать бетонную смесь).

Screed, plaster – A small strip of wood, usually the thickness of the plaster coat, used as a guide for plastering (выравнивать штукатурку).

Scribing – Cutting and fitting woodwork to an irregular surface (подгонка).

Scupper – (1) An opening for drainage in a wall, curb or parapet. (2) The drain in a downspout or flat roof, usually connected to the downspout (водоотпускное отверстие в парапете, желоб для стока воды).

Sealer – A finishing material, either clear or pigmented, that is usually applied

directly over raw wood for the purpose of sealing the wood surface (герметик, грунтовочное покрытие).

Seasoning – Drying and removing moisture from green wood in order to improve its usability (сушка древесины).

Self-sealing shingles – Shingles containing factory-applied strips or spots of self-sealing adhesive (самоуплотняющаяся черепица).

Semi-detached house – A house that is joined to another house on one side by a shared wall (сблокированный дом, особняк из двух квартир).

Semigloss paint or enamel – A paint or enamel made so that its coating, when dry, has some luster but is not very glossy. Bathrooms and kitchens are normally painted semi-gloss (краска для полуматовых покрытий).

Shallow foundation – A type of building foundation that transfers structural load to the earth very near to the surface, rather than to a subsurface layer or a range of depths, as does a deep foundation (фундамент мелкого заложения, мелкозаглубленный фундамент).

Sheathing, sheeting – The structural wood panel covering, usually OSB or plywood, used over studs, floor joists or rafters/trusses of a structure (листовая обшивка).

Shed roof – A roof containing only one sloping plane (скатная крыша).

Sheet metal work – All components of a house employing sheet metal, such as flashing, gutters, and downspouts (изделия из листового металла).

Shingles – A thin, flat tile made of wood, slate, etc. that is fixed in rows to make a roof or wall covering (плоская кровельная черепица, шиндель).

Siding – The finished exterior covering of the outside walls of a frame building (сайдинг).

Single-column footing – A square, rectangular, or circular slab that supports the structural members individually. Generally, each of its columns gets its footing to transmit and distribute the load of the structure towards the soil underneath. Sometimes, an isolated footing can be sloped or stepped at the base to spread greater loads. This type of footing is used when the structural load is relatively low, columns are widely spaced, and the soil's bearing capacity is adequate at a shallow depth. Also known as **isolated footing** (столбчатый фундамент).

Skyscraper – A very tall building in a city (небоскреб).

Slab on grade – A type of foundation with a concrete floor which is placed directly on the soil. The edge of the slab is usually thicker and acts as the footing for the walls (бетонная плита на грунтовом основании).

Sleeve(s) – Pipe installed under the concrete driveway or sidewalk, and that will be used later to run sprinkler pipe or low voltage wire (гильза трубопровода).

Slope – The incline angle of a roof surface, given as a ratio of the rise (in inches) to the run (in feet). See also **pitch** (скат крыши).

Slump – The «wetness» of concrete. A 3 inch slump is dryer than a 5 inch slump (осадка конуса бетонной смеси).

Slurry – a mixture of solids denser than water suspended in liquid, usually water (гидросмесь, жидкий цементный раствор; глинистая суспензия, жидкая глина).

Starter strip – Asphalt roofing applied at the eaves that provides protection by filling in the spaces under the cutouts and joints of the first course of shingles (нижняя полоса рулонной кровли).

Stair carriage or stringer – Supporting member for stair treads. Usually a 2 x 12 inch plank notched to receive the treads; sometimes called a «rough horse» (косоур).

Stair rise – The vertical distance from stair tread to stair tread (and not to exceed 7 1/2") (лестничный марш).

Stops – Moldings along the inner edges of a door or window frame. Also valves used to shut off water to a fixture (стопперы, ограничители).

Storey (US English story) – A level of a building; a floor (этаж).

Stretch ceiling - A suspended ceiling system consisting of two basic components – a perimeter track and lightweight fabric membrane which stretches and clips into the track. In addition to ceilings the system can be used for wall coverings, light diffusers, floating panels, exhibitions and creative shapes (натяжной потолок).

Strip flooring – Wood flooring consisting of narrow, matched strips (дощатое покрытие пола).

Strip footing - a continuous strip that supports structural and non-structural load bearing walls. Found directly under the wall, Its width is commonly 2-3 times wider than the wall above it (ленточный фундамент).

Structural floor – A framed lumber floor that is installed as a basement floor *instead* of concrete. This is done on very expansive soils (несущее перекрытие).

Stub, stubbed – To push through (проталкивать).

Stucco – Refers to an outside plaster finish made with Portland cement as its base (стукко).

Stud – A vertical wood framing member, also referred to as a wall stud, attached to the horizontal sole plate below and the top plate above. Normally 2 x 4's or 2 x 6's, 8' long (sometimes 92 5/8"). One of a series of wood or metal vertical structural members placed as supporting elements in walls and partitions (свая, стойка каркаса).

Suspended ceiling – A ceiling system supported by hanging it from the overhead structural framing (подвесной потолок).

T & G, tongue and groove – A joint made by a tongue (a rib on one edge of a board) that fits into a corresponding groove in the edge of another board to make a tight flush joint. Typically, the subfloor plywood is T & G (шпунт).

Tempered – Strengthened. Tempered glass will not shatter nor create shards, but will «pelletize» like an automobile window. Required in tub and shower enclosures and locations, entry door glass and sidelight glass, and in a window when the window sill is less than 16" to the floor (закаленное стекло).

Terra cotta – A ceramic material molded into masonry units (терракота).

Threshold – The bottom metal or wood plate of an exterior door frame. Generally they are adjustable to keep a tight fit with the door slab (дверной порог).

Timbercrete – An interesting building material made of sawdust and concrete mixed together (деревобетон).

Treated lumber – A wood product which has been impregnated with chemical

pesticides such as CCA (Chromated Copper Arsenate) to reduce damage from wood rot or insects. Often used for the portions of a structure which are likely to be in contact with soil and water. Wood may also be treated with a fire retardant (обработанная древесина).

Truss – A structural framework of wood or metal, especially one arranged in triangles, used to support a roof, bridge, etc. (ферма, стропильная ферма).

Ultimate tensile strength (UTS) – The maximum stress that a material can withstand while being stretched or pulled before breaking. In brittle materials the ultimate tensile strength is close to the yield point, whereas in ductile materials the ultimate tensile strength can be higher (предел прочности).

Undercoat – A coating applied prior to the finishing or top coats of a paint job. It may be the first of two or the second of three coats. Sometimes called the Prime coat (первый слой при окраске, первое покрытие штукатурки, первый слой грунтовки).

Underground plumbing – The plumbing drain and waste lines that are installed beneath a basement floor (подземный сточный трубопровод).

Underlayment – A ¼" material placed over the subfloor plywood sheeting and under finish coverings, such as vinyl flooring, to provide a smooth, even surface. Also a secondary roofing layer that is waterproof or water-resistant, installed on the roof deck and beneath shingles or other roof-finishing layer (стяжка, кровельный ковер).

Union – A plumbing fitting that joins pipes end-to-end so they can be dismantled (муфта разъемная).

Valley – The «V» shaped area of a roof where two sloping roofs meet. Water drains off the roof at the valleys (выемка, ложбина).

Veneer – Extremely thin sheets of wood. Also a thin slice of wood or brick or stone covering a framed wall (шпон, кирпичная облицовка).

Vermiculite – A mineral used as bulk insulation and also as aggregate in insulating and acoustical plaster and in insulating concrete floors (вермикулит).

Warping – Any distortion in a material (деформация).

Weatherization – Work on a building exterior in order to reduce energy consumption for heating or cooling. Work involving adding insulation, installing storm windows and doors, caulking cracks and putting on weather-stripping (модификации зданий с целью сокращения объемов потребления и увеличения эффективности использования энергии).

Welding – The activity of uniting metal or plastic by softening with heat and hammering, or by fusion (сварка).

Window well - A recess in the ground around a building to allow for installment of bigger windows in a basement either below ground or partially below ground (приямок).

Zoning – A governmental process and specification, which limits the use of a property, e.g. single family use, high-rise residential use, industrial use, etc. Zoning laws may limit where you can locate a structure (градостроительное зонирование).

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Учебное издание

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