МИНИСТЕРСТВО СЕЛЬСКОГО ХОЗЯЙСТВА
И ПРОДОВОЛЬСТВИЯ РЕСПУБЛИКИ БЕЛАРУСЬ

ГЛАВНОЕ УПРАВЛЕНИЕ ОБРАЗОВАНИЯ,
НАУКИ И КАДРОВОЙ ПОЛИТИКИ

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СЕЛЬСКОХОЗЯЙСТВЕННАЯ АКАДЕМИЯ»

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АНГЛИЙСКИЙ ЯЗЫК

CIVIL ENGINEERING

Сборник текстов и упражнений
для студентов, обучающихся по специальности
1-74 04 01 Сельское строительство и обустройство территорий

В двух частях

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

Для студентов, обучающихся по специальности 1-74 04 01 Сельское строительство и обустройство территорий.

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ВВЕДЕНИЕ

Сборник текстов и упражнений предназначен для студентов, обучающихся по специальности 1-74 04 01 Сельское строительство и обустройство территорий.

Цель материалов сборника – познакомить студентов с английской терминологией по специальности и подготовить их к чтению оригинальной научно-технической литературы. Сборник состоит из трех разделов. Каждый раздел посвящен определенной теме и состоит из нескольких уроков. Тексты для уроков взяты из оригинального источника и адаптированы (разработки снабжены поурочным словарем). Каждый урок состоит из предтекстовых и послетекстовых заданий и текста. Целью предтекстовых заданий является снятие лексико-грамматических трудностей при чтении текста. Послетекстовые задания направлены на закрепление лексико-грамматического материала и состоят из двух разделов: «Comprehension» и «Vocabulary and Grammar».

Сборник текстов и упражнений рекомендован как для аудиторной работы студентов в сотрудничестве с преподавателем, так и для самостоятельной работы.

UNIT 1

ROADS

Lesson 1

Pre-reading task

Exercice 1. Read the words and learn them.

To tend – стремиться, иметь тенденцию к чему-либо
To take for granted – принимать как само собой разумеющееся
Vast – огромный
Extensive – большой, протяженный
Well-maintained – в хорошем состоянии
Grumbling – ворчание
Pothole – выбоина, рытвина, яма
Traffic jam – затор в уличном движении, «пробка»
To pave – мостить
Paved road – мощеная дорога
Site – территория, площадка, строительная площадка
Route – маршрут, путь
Market outlet – рынок сбыта, торговая точка
To carry – нести, перевозить
To stretch – тянуться, простираться
To consume – потреблять
Supplies – припасы, провиант
Equipment – оборудование
Engineer corps – инженерный корпус; инженерные войска
Pontoon bridge – понтонный мост
To level – выравнивать
Track – тропа, курс, путь
Cart – телега, повозка
Siege engine – осадное орудие
Stone – камень

Exercise 2. Make up your own sentences with the words given above. Use as many words as possible.

Exercise 3. Before reading the text study the following words.

Egypt – Египет
the Pharaoh Cheops – фараон Хеопс

the Great Pyramid – Пирамида Хеопса (Великая пирамида Гизы)
the Silk Route – Шелковый путь
China – Китай
Asia – Азия
Spain – Испания
the Atlantic Ocean – Атлантический океан
The Old Testament – Ветхий Завет
Damascus – город Дамаск
Palestine – Палестина
the Gulf of Aqaba – залив Ака́ба (также Эйлатский залив)
Syria – Сирия
Mesopotamia – Месопотамия
Trajan's Road – дорога Траяна
the Romans – римляне
the Crusaders – крестоносцы
the Assyrian Empire – Ассирия
the Persians – персы
the Persian Gulf – Персидский залив
the Aegean Sea – Эгейское море
Carthage – город Карфаген
Africa – Африка

Exercise 4. Before you start.

- When was the first road built?
- Who built it?
- What was its purpose?

Exercise 5. Read and translate the text.

Text A

Roads. How it all started

Most of us give very little thought to the roads we drive on every day, and tend to take them for granted – at least until they are closed for repairs, washed out in a flood and so on. However, only during the past forty years or so have we enjoyed the luxury of a vast, extensive, and well-maintained system of roads accessible to everyone. In the midst of our grumbling about potholes, traffic jams, and incompetent drivers, we forget how fortunate we truly are. Obviously, it was not always the case.

From the earliest times, one of the strongest indicators of a society's

level of development has been its road system – or lack of one. Increasing populations and the advent of towns and cities brought with it the need for communication and commerce between those growing population centres.

A road built in Egypt by the Pharaoh Cheops around 2500 BC is believed to be the earliest paved road on record – a construction road 1,000 yards long and 60 feet wide that led to the site of the Great Pyramid.

The various trade routes, of course, developed where goods were transported from their source to a market outlet and were often named after the goods which travelled upon them. For example, the Silk Route stretched 8,000 miles from China, across Asia, and then through Spain to the Atlantic Ocean. However, carrying bulky goods with slow animals over rough, unpaved roads was a time consuming and expensive. As a rule, the price of the goods doubled for every 100 miles they had to travel.

Some other ancient roads were established by rulers and their armies. The Old Testament contains references to ancient roads like the King's Highway, dating back to 2000 BC. This was a major route from Damascus in Palestine, and ran south to the Gulf of Aqaba, through Syria to Mesopotamia, and finally on to Egypt. Later it was renamed Trajan's Road by the Romans, and was used in the eleventh and twelfth centuries by the Crusaders.

Around 1115 BC the Assyrian Empire in western Asia began what is believed to be the first organized road-building, and continued it for 500 to 600 years. Since they were trying to dominate that part of the world, they had to be able to move their armies effectively along with supplies and equipment. Their army's engineer corps laid pontoon bridges and levelled tracks for carts and siege engines.

Later another imperial road, the Royal Road, was being built by the Persians from the Persian Gulf to the Aegean Sea, a distance of 1,775 miles. Around 800 BC, Carthage, on the northern coast of Africa, began to use stones for paving roads. Although they may not have been the first to pave their roads with stones, they were among the earliest, and some people believe that the Romans imitated Carthaginian techniques.

Comprehension

Exercise 6. Answer the following questions.

1. What was one of the indicators of the level society's development?
2. When and where was the first paved road built?
3. Where did it lead?

4. What was one of the main purposes to create routes?
5. How long was the Silk Route?
6. By whom were some ancient roads established?
7. What is the King's Highway?
8. What country began the first organized road-building?
9. Why did the country do it?
10. What road was built by Persians?
11. What is the achievement of Carthage?

Exercise 7. Say if the sentences are true or false.

1. People always have had a good system of roads.
2. Any developed society doesn't have and doesn't need road system.
3. The first paved road was built by Tutankhamun.
4. The Pharaoh Cheops road was 1,000 yards long and 60 feet wide.
5. Ancient routes were usually called after people who built them.
6. The Silk Route includes China, Asia, Egypt and Spain.
7. Romans called the King's Highway Trajan's Road.
8. The Assyrian Empire built its road for 200 years.
9. Assyrians used pivots (опоры) to build their bridges.
10. Romans imitated Carthaginian techniques when building their roads.

Vocabulary and Grammar

Exercise 8. Say the same in English.

В хорошем состоянии; громоздкие грузы; дорожная система; некомпетентные водители; уровень развития; мощеная дорога; торговый путь; инженерные войска; понтонный мост; тропа; строительство дороги; камень; расстояние; широкий; появление городов; оборудование; занимающий много времени; первое организованное дорожное строительство.

Exercise 9. Match the words with their definitions.

1	pothole	a	to cover an area of ground with a hard, flat surface of pieces of stone, concrete, or bricks
2	route	b	a large number of vehicles close together and unable to move or moving very slowly
3	to pave	c	a bridge that floats on water and in which barge- or boat-like pontoons support the bridge deck and its dynamic loads

4	traffic jam	d	a logistical network identified as a series of pathways and stoppages used for the commercial transport of cargo / a particular way or direction between places
5	to carry	e	the set of necessary tools, clothing, etc. for a particular purpose
6	pontoon bridge	f	a type of disruption in the surface of a roadway where a portion of the road material has broken away, leaving a hole
7	equipment	g	to make something flat
8	to level	h	move someone or something from one place to another

Exercise 10. Make up word combinations and translate them.

1. extensive	a. corps
2. incompetent	b. outlet
3. trade	c. road
4. engineer	d. system of roads
5. slow	e. goods
6. market	f. jam
7. bulky	g. route
8. road	h. bridge
9. traffic	i. animals
10. paved	j. system
11. pontoon	k. drivers

Exercise 11. Fill in the gaps with the suitable words: *pontoon bridges, stretched, communication, goods, carts, route.*

1. Increasing populations and the advent of towns and cities brought with it the need for _____ and commerce between those growing population centres.

2. The various trade routes, of course, developed where _____ were transported from their source to a market outlet.

3. The Silk Route _____ 8,000 miles from China, across Asia, and then through Spain to the Atlantic Ocean.

4. The King's Highway was a major _____ from Damascus in Palestine, and ran south to the Gulf of Aqaba, through Syria to Mesopotamia, and finally on to Egypt.

5. The Assyrian Empire army's engineer corps laid _____ and levelled tracks for _____ and siege engines.

Exercise 12. Give the missing forms of the verbs. Translate the verbs.

	V_1	V_2	V_3	Translation
1	build			
2		ran		
3		were		
4			brought	
5		began		
6	take			
7			given	
8	drive			
9		led		

Exercise 13. Translate the sentences from Russian into English.

1. С самых ранних времен одним из самых сильных показателей уровня развития общества была его дорожная система – или ее отсутствие.

2. Дорога, построенная в Египте фараоном Хеопсом около 2500 года до н. э., считается самой ранней мощеной дорогой в истории.

3. Разумеется, развивались различные торговые маршруты, по которым товары перевозились от их источника до торговой точки и часто назывались в честь товаров, которые по ним путешествовали.

4. Перевозка громоздких грузов с медлительными животными по неровным грунтовым дорогам была трудоемкой и дорогостоящей и, как правило, цена товара удваивалась за каждые 100 миль, которые им приходилось преодолевать.

5. Некоторые древние дороги были проложены правителями и их армиями.

6. Около 800 года до нашей эры Карфаген, расположенный на северном побережье Африки, начал использовать камни для мощения дорог.

Exercise 14. Discuss with the group the following topics:

- Which of the roads mentioned in the text do you find more important?
- Are there any other famous ancient roads or routes? (use the Internet for additional information)

Lesson 2

Pre-reading task

Exercise 1. Read the words and learn them.

Road builder – строитель дорог
Network of roads – система дорог
To maintain – осуществлять техническое обслуживание
To radiate – расходиться лучами
To compose – здесь: составлять, складывать
Course – слой
Bedding – основание, выравнивающий слой
Sand – песок
Soil –почва, грунт
Mortar – раствор (строительный)
Gravel – гравий
Lime – известняк
Flint – кремень, мелкий песчаник
Thick – толстый
Width – ширина
Roadway – дорожное полотно
Branch – ветвь
To extend – расширять
To invent – изобретать
Wheel – колесо
Draft animals – тягловые животные
Vehicle – транспортное средство
To ascend – подниматься, восходить
Steep – круто, высоко
Incline – склон, скат, уклон
Consecutive – последовательный, следующий друг за другом
Swamp – трясина, болото
Causeway – дорога по насыпи на заболоченной территории
Surface – поверхность

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Before reading the text study the following words.

the Romans – римляне
the Roman Empire – Римская империя
England – Англия

Western Europe – Западная Европа
the Iberian Peninsula – Пиренейский полуостров
the Mediterranean – Средиземное море
Great Britain – Великобритания
the Atlantic Ocean – Атлантический океан
the Inca Empire – Империя инков
South America – Южная Америка
Ecuador – Эквадор
Colombia – Колумбия
Bolivia – Боливия
Argentina – Аргентина
Chile – Чили
the Incas – инки
the Spaniards – испанцы
Spanish – испанский

Exercise 4. Before you start.

- Who are the most famous road builders?
- What civilizations do you know? Do they still exist?

Exercise 5. Read and translate the text.

Text B

Roman roads

Without doubt, the champion road builders were ancient Romans, who, until modern times, built the world's straightest, best engineered, and most complex network of roads in the world. At their height, the Roman Empire maintained 53,000 miles of roads, which covered all of England to the north, most of Western Europe, radiated throughout the Iberian Peninsula, and encircled and crisscrossed the entire Mediterranean area. Famous for their straightness, Roman roads were composed of a soil foundation topped by four courses: a bedding of sand or mortar; rows of large, flat stones; a thin layer of gravel mixed with lime; and a thin surface of flint-like lava. Typically they were 3 to 5 feet thick and varied in width from 8 to 35 feet, although the average width for the main roads was from 12 to 24 feet. Their design remained the most sophisticated until the advent of modern road building technology in the very late 18th and 19th centuries. Many of their original roads are still in use today, although they have been resurfaced numerous times.

Under Roman law, the public had the right to use the roads, but the district through which a road passed was responsible for the maintenance of the roadway. This system was effective so long as a strong central authority existed to enforce it. Unfortunately, as the Roman Empire declined so did their roads and their work fell into disrepair all across Europe and Great Britain.

South America

On the other side of the Atlantic Ocean, several centuries after the fall of the Roman Empire, the Inca Empire began to rise in South America during a period that corresponded with the Middle Ages in Europe. Centred in what is now Peru, the Incas branched out into Ecuador, Colombia, Bolivia, Argentina, and Chile, and, like the Romans, recognized the need for a system of roads that would enable them to extend their conquests and to govern their empire. Interestingly enough, the Incas built their empire without inventing the wheel, without the use of draft animals, and without a written language. Because they had no wheeled vehicles to worry about, their roads could ascend steep inclines via terraces or steps.

In one place a road going up a steep mountainside was built of 3,000 consecutive stone steps. They also built over swamps, and constructed a causeway 24 feet wide and 8 miles long, which had a paved surface and stone walls. Unfortunately, their well-constructed system of roads assisted in their downfall as the invading Spaniards used the Incas' own roads to move Spanish armies, weapons, and supplies.

Comprehension

Exercise 6. Answer the following questions.

1. Why did the Romans decide to build roads?
2. What territory did Roman roads cover?
3. How long are they?
4. What was the design of these roads?
5. Are Roman roads used nowadays?
6. Who was responsible for the maintenance of the road?
7. What did the Incas recognize?
8. Why did Inca roads differ from Roman roads?
9. What territory did Inca roads cover?
10. What was the reason for road building?

11. What was the difficulty in building Inca roads?

12. Why were the roads one of the components to lead to Inca civilization fell down?

Exercise 7. Say if the sentences are true or false.

1. First road builders were the Babylonians.

2. The technology of Roman road building used to be advanced till X century.

3. For road-building Romans used sand, mortar, flat stones and flint-like lava.

4. According to Roman law rich and powerful Roman citizens were responsible for the maintenance of roads.

5. The system of road maintenance was effective.

6. The Inca civilization developed on the coast of the Pacific Ocean.

7. The Incas decided to build roads to deliver letters from one town to another.

8. The Incas didn't have wheeled transport so they didn't need very wide roads.

9. The civilization lived in mountainous region that's why their roads had terraces and steps.

10. British invaders used Inca roads to conquer the Inca Empire.

Vocabulary and Grammar

Exercise 8. Say the same in English.

Мощеная поверхность; дорожное полотно; тягловые животные; хорошо построенная система дорог; крутой склон горы; колесная техника; появление современной дороги; последовательные каменные ступени; тонкая поверхность кремневидной лавы; тонкий слой щебня с примесью извести;

Exercise 9. Match the words with their definitions.

1	sand	a	small rounded stones, often mixed with sand
2	mortar	b	the part of the road on which vehicles drive
3	gravel	c	a raised path, especially across a wet area
4	road builder	d	a circular object connected at the centre to a bar, used for making vehicles or parts of machines move
5	roadway	e	a substance that consists of very small grains of rock, found on beaches and in deserts

6	wheel	f	animals, usually domesticated, those are kept by humans and trained to perform tasks
7	causeway	g	individual involved into the process of road construction
8	draft animals	h	a workable paste used to bind construction blocks together and fill the gaps between them

Exercise 10. Put the following words in the right column: ***swamp, govern, wheel, width, effective, numerous, maintenance, straightness, foundation, layer, typically, extend, interestingly, enforce, steep, causeway, technology, bedding, surface, gravel, consecutive, recognize, conquest.***

NOUN	VERB	ADJECTIVE	ADVERB

Exercise 11. Translate the sentences from Russian into English.

1. Римские дороги состояли из грунтового основания, увенчанного четырьмя дорожками: подстилкой из песка или раствора; рядами больших плоских камней; тонкий слой гравия, смешанного с известью, и тонкая поверхность похожей на кремень лавы.
2. По римскому праву население имело право пользоваться дорогами, но район, через который проходила дорога, отвечал за содержание проезжей части.
3. К сожалению, по мере того, как Римская империя приходила в упадок, их дороги и их работа приходили в негодность по всей Европе и Великобритании.
4. Через несколько столетий после падения Римской империи, империя инков начала подниматься в Южной Америке в период, который соответствовал Средневековью в Европе.
5. Подобно римлянам, инки признали необходимость системы дорог, которая позволила бы им расширить свои завоевания и управлять своей империей.
6. Инки построили свою империю без изобретения колеса, без использования тягловых животных и без письменности.
7. Хорошо построенная система дорог способствовала падению

империи инков, поскольку вторгшиеся испанцы использовали собственные дороги инков для перемещения испанских армий, оружия и припасов.

Exercise 12. Using the information from the text compare the road systems of two civilizations: Roman roads and Inca roads.

Lesson 3

Pre-reading task

Exercise 1. Read the words and learn them.

Timing – расчет времени
Land survey – топографическая съемка
To handle – осуществлять, проводить, контролировать
Evaluating – оценка
To take into account – учитывать, принимать во внимание
To maintain – сохранять, поддерживать
Data – данные, сведения
Transportation planner – дорожно-транспортный планировщик
Environmentalist – эколог
Landscape architect – специалист по вопросам ландшафтной архитектуры
Soil scientist – почвовед
To determine – определить
Accuracy – точность
Terrain – грунт
Drainage – водоотвод
Capability – возможность, способность
Ratio – соотношение
Level – уровень (n); выравнивать (v)
To provide – обеспечивать
Screened dirt – просеянный грунт
Bump – дорожная неровность
Dip – впадина
To spray – опрыскивать
To compact – спрессовывать
Density – плотность
Sewer – канализационная труба
Paving – мощение

Crushed rock – щебень
Finishing machine – бетоноотделочная машина
Joint – стык
Wire basket – сетчатая корзина
Dowel – стыковой стержень
Paving equipment – асфальтобетоноукладочное оборудование
To grind – шлифовать
Landscaping – озеленение
Pavement marking – дорожная разметка

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Before you start.

- Have you ever seen road works? What were the road builders doing?
- What do you think about the quality of roads in our country? What influences the quality of roads?

Exercise 4. Read and translate the text.

Text C

Road construction process

Pre-construction activities. The type of construction adopted for a particular road depends on:

- the volume and nature of traffic;
- the nature of available materials;
- the topography;
- foundation conditions;
- type and availability of construction equipment;
- financing arrangements and timing.

There are many steps in the road construction process. They involve many teams of people and much organization from the use of a surveying company to handle land surveys to project managers. The steps must be carefully followed to ensure a successful project is completed. These steps can be summarized as:

- planning;
- design;
- earthworks;
- pavement construction;
- open to traffic.

Step I: Planning. A road project begins with evaluating the transportation system, taking into account statewide priorities, including strategic plans for the state's transportation system. Department of Transportation collects and maintains information about our roads, including road and bridge conditions, traffic volumes and crash statistics. Using this data, transportation planners, engineers, environmentalists, landscape architects, soil scientists and others identify trends that determine what and how to build.

Step II. Design. A survey of the area is step two. Recently, Global Positioning Systems, laser surveys, and other technology have sped up the process and improved accuracy. Many factors influence designs, including location, terrain and soil properties, drainage capabilities, traffic volume, the ratio of cars to trucks and buses, possible future development in the area, effects on the environment or nearby residents.

Step III. Earthwork. Earthwork is one of the most important elements in road construction because it establishes a stable foundation. The aim of the earthworks phase of the construction is to position the subgrade underlying the pavement layers in the right location and at the correct level and to provide drainage. First, embankments are built. Next, a grader or bulldozer levels the screened dirt. Leveling bumps and filling in dips creates a surface that will support a road for decades. The screened dirt is sprayed with water and compacted to its maximum density. During this stage, drains and sewers are installed. The center of the road must be higher than the edges so water will run off into the storm sewers. Drainage is a critical element because improper drainage will greatly reduce the new pavement's life expectancy. All of this work must pass strict inspections before the project can continue. To complete the earthwork, workers place gravel in 12-inch layers on the roadbed, then moisten and compact each layer. Layers are added and compacted until the roadbed reaches the height called for in the design. The earthwork is often the largest task in the road building process and therefore careful planning and organization are essential. Speed and efficiency depend very much upon the quantity and types of earthmoving plant available.

Construction activities

Step IV. Pavement. Construction At last, the roadbed is ready for paving. Planners and engineers study such factors as the cost of maintaining the road, the amount and type of traffic, the cost of paving material. A formula that includes all these factors tells engineers to use either asphalt (bituminous) or concrete pavement. Asphalt uses bitumen, a petroleum

product, to glue together sand and crushed rock. This mixture is heated to approximately 300 degrees at the asphalt plant. At the construction site, workers spread and compact the hot mixture onto the roadbed. Concrete uses cement and water as the glue between sand and crushed rock. Workers place concrete into steel molds called forms. A finishing machine vibrates and trims it to the necessary height. To prevent cracks, workers cut joints between the concrete slabs. At each joint, wire baskets and steel dowels connect the slabs. These allow the slabs to expand and contract as the temperature changes. The slabs can slide from side to side along the dowels, but not up and down.

Step V. Open to traffic. With the new surface in place, quality testing is conducted. Testers use seismology equipment to measure vibrations of the new pavement. If there is too much vibration, the contractor must grind the pavement to ensure a smooth surface. The final steps are:

- another drainage test;
- grading and landscaping around the pavement (where applicable);
- applying the permanent pavement markings.

Comprehension

Exercise 5. Answer the following questions.

1. What are the main factors on which the type of construction depends?
2. How many steps are distinguished in road construction?
3. What does the road project begin with?
4. What data do transportation planners and others use to identify trends? What has improved the accuracy of surveying the area?
5. Why is earthwork considered one of the most important elements in road construction?
6. By what machines is the screened dirt leveled?
7. When are drains and sewers installed?
8. Why should the centre of the road be higher than the edges?
9. What do speed and efficiency of earthworks depend upon?
10. How many stages are distinguished in highway pre-construction and construction activities?
11. What tells the engineers to use either asphalt or concrete pavement?
12. What does asphalt use to glue sand and crashed stone?
13. What connects the slabs at each joint?
14. Why is landscaping around the pavement necessary?
15. What does concrete use to glue sand and crashed stone?

16. What does seismology equipment measure?

17. What are the final steps?

Exercise 6. Say if the sentences are true or false.

1. The type of road construction doesn't depend on any factors.

2. The road construction process involves many teams of people and much organization.

3. A road project begins with positioning the subgrade underlying the pavement layers in the right location.

4. Global Positioning Systems, laser surveys and other technology have slowed down the process of surveying the area.

5. Terrain and soil properties, drainage capabilities, traffic volume have no influence on design.

6. Earthwork establishes a stable foundation.

7. Improper drainage reduces the new pavement's life expectancy.

8. Excavator levels the screened dirt.

9. Screened dirt is sprayed with water at the stage of paving.

10. Asphalt uses cement and water to glue together sand and water.

11. Concrete slabs can slide from side to side, up and down.

12. Seismology equipment is used to measure vibrations of the new pavement.

13. Applying pavement markings is the initial step in road building activities.

14. Workers cut joints between the concrete slabs to prevent cracks.

15. Contractor grinds the pavement if there is too much vibration.

Vocabulary and Grammar

Exercise 7. Say the same in English.

Статистика аварий; срок службы; воздействие на окружающую среду; находящийся под слоем дорожной одежды; ускорить процесс; прочный фундамент; подготовительные строительные работы; обеспечить водоотвод; максимальная плотность; интенсивность движения; приоритеты государственного масштаба; соотношение автомобилей и грузовиков; выравнивание дорожных неровностей; заливается бетон; предотвращение трещин; содержание дороги; современное асфальтобетоноукладочное оборудование; отшлифовать покрытие; приблизительно 300 градусов; долговременная дорожная разметка; дорожное полотно; озеленение вокруг дорожного покрытия; гладкая поверхность.

Exercise 8. Match the words with their definitions.

1	topography	a	space-based satellite navigation system that provides location and time information in all weather conditions
2	pavement marking	b	activity of growing plants with the aim of creating a beautiful environment
3	sewer	c	a piece of construction equipment used to lay asphalt on roads, bridges, parking lots and other such places
4	Global Positioning System	d	the native material underneath a constructed road
5	landscaping	e	to produce a smooth finish on flat surfaces
6	paving	f	the shape and arrangement of physical features on a surface
7	paving equipment	g	an underground conduit for carrying off drainage water and waste matter
8	earthwork	h	material used on a road surface in order to provide separation between traffic moving in opposite directions
9	drain	i	sticky, black and highly viscous liquid or semisolid form of petroleum
10	asphalt	j	work involving moving quantities of soil
11	to grind	k	surfacing of roads and walkways
12	subgrade	l	a collection and transportation system for storm water

Exercise 9. Put the following words in the right column: ***factor, cost, type, include, bitumen, approximately, glue, rock, heat, roadbed, hot, steel, height, prevent, necessary, joint, concrete, change, slab, expand, slide, dowel, new, quality, conduct, grind, permanent, marking.***

NOUN	VERB	ADJECTIVE	ADVERB

Exercise 10. Find in the text synonyms to the following words and word combinations.

Information, ecologist, precision, correlation, decrease, get better, affect, lorry, location, wrong, price, quantity, using.

Exercise 11. Translate the sentences from Russian into English.

1. Иногда земля не подходит для озеленения.
2. Бульдозер выравнивает просеянный грунт.
3. Мы должны принять во внимание все факторы, включая интенсивность движения и доступные материалы.
4. Огромное количество специалистов, таких как почвоведы, экологи, инженеры вовлечены в строительство дорог.
5. Подрядчик отвечает за безопасность рабочих на стройплощадке. Дорожная разметка – заключительная часть дорожных работ.
6. Ливнеприемники устанавливаются на этапе земляных работ.
7. Ось дороги выше обочин.
8. Рабочие укладывают слой гравия на песчаный слой.
9. Скорость и эффективность работы зависит от асфальто/ бетоноукладочного оборудования.
10. Дорожные неровности уменьшают срок службы дорожной одежды. Битум связывает песок и щебень.
11. Бетон состоит из цемента и воды.
12. Рабочие укладывают асфальт на дорожное полотно.
13. Стальные стыковые стержни связывают бетонные плиты.
14. Под слоем дорожной одежды находится грунтовое основание.
15. Вода уплотняет просеянный грунт.

UNIT 2

NATURAL BUILDING MATERIALS

Lesson 1

Pre-reading task

Exercise 1. Read the words and learn them.

In comparison with – по сравнению
Unsuitable – непригодный
Enormous – огромный
To derive – получать

Softwood – мягкая древесина
Hardwood – твёрдая древесина
Panelling – панельная обшивка
Veneering – обшивка фанерой (кирпичом, шпоном)
Durability – прочность, надежность
Wallplate – стенная балка; стеновая плита
Sap – сок
Resilience – упругость, эластичность

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Read and translate the text.

Text A

Timber

Timber is the most ancient building material. In comparison with steel timber is lighter, cheaper, easier to work and its mechanical properties are good. On the other hand, timber has certain disadvantages. First, it burns and is therefore unsuitable for fireproof buildings. Second, it decays.

At present an enormous amount of timber is employed for a vast number of purposes. In building timber is used too.

Timber is a name applied to the cut material derived from trees. Timber used for building purposes is divided into two groups: softwoods and hardwoods. Hardwoods are chiefly used for decorative purposes, as for panelling, veneering in furniture, and some of them are selected for building use because of their high strength and durability. In modern construction timber is often used for window and door frames, flooring, fences and wallplates, for temporary buildings and unpainted internal woodwork.

Timber cannot be used for either carpenters' or joiners' work immediately it has been felled because of the large amount of sap which it contains. Most of this moisture must be removed, otherwise the timber will shrink excessively, causing defects in the work and a tendency to decay. Elimination of moisture increases the strength, durability and resilience of timber.

Comprehension

Exercise 4. Answer the following questions.

1. Is timber a very ancient building material?

2. What are the advantages of timber in comparison with steel?
3. What are the disadvantages of timber in comparison with steel?
4. Into what groups is timber, used for building purposes, divided?
5. For what purposes are hardwoods chiefly used?
6. For what purposes is timber often used in modern construction?
7. What increases the strength, durability and resistance of timber?

Exercise 5. Say if the sentences are true or false.

1. The mechanical properties of timber are good.
2. Timber is suitable for fireproof buildings.
3. Today an enormous amount of timber is employed for a vast number of purposes.
4. Softwoods are chiefly used for decorative purposes.
5. Timber can be used for either carpenters' or joiners' work immediately it has been felled.
6. Elimination of moisture decreases the strength, durability and resilience of timber.

Vocabulary and Grammar

Exercise 6. Say the same in English.

Самый древний строительный материал; высокая прочность и долговечность; определенные преимущества и недостатки; оконные и дверные рамы; устранение влаги; непригодна для огнеупорных зданий; плотницкие и столярные работы; склонность к гниению; сила, прочность и упругость древесины; современное строительство; мягкая древесина; дефекты в работе.

Exercise 7. Give the missing forms of the adjectives.

Positive	Comparative	Superlative
		the highest
ancient		
	cheaper	
	earlier	the earliest
good		
modern		
	lighter	

Exercise 8. Fill in the gaps using the following words: *softwoods, fireproof, frames, ancient, veneering, wallplates.*

1. Timber is the most _____ building material.
2. Timber burns and therefore unsuitable for _____ buildings.
3. Timber used for building purposes is divided into two groups: _____ and hardwoods.
4. Hardwoods are chiefly used for decorative purposes, as for paneling and _____ in furniture.
5. In modern construction timber is often used for window and door _____, flooring, fences and_____, for temporary buildings and unpainted internal woodwork.

Exercise 9. Translate the sentences from Russian into English.

1. Древесина имеет хорошие механические свойства.
2. По сравнению со сталью древесина легче и дешевле в обработке.
3. Древесина – это название, применяемое к срезанному материалу, полученному из деревьев.
4. В современном строительстве древесина часто используется для оконных и дверных рам, напольных покрытий, заборов и стеновых плит, для временных зданий и неокрашенных внутренних деревянных конструкций.
5. Древесина не может быть использована ни для плотницких, ни для столярных работ сразу после ее вырубки из-за большого количества содержащегося в ней сока.
6. Большая часть влаги в древесине должна быть удалена, иначе древесина чрезмерно усохнет, что приведет к дефектам в работе и склонности к гниению.

Lesson 2

Pre-reading task

Exercise 1. Read the words and learn them.

Crushed stone – щебень, дробленый камень
Dimension stone – размерный камень
Slab – плита
Medieval – средневековый
Renaissance – возрождение
To erect – сооружать, воздвигать
Stone masonry – каменная кладка

Scarcity – нехватка, дефицит
Granite – гранит
Basement – основа, фундамент
Sandstone – песчаник
Quarts – кварц
Sill – подоконник
Aggregate – заполнитель
Marble – мрамор
Stairway – лестница
Hearths – очаг, горн, топка, камин
Limestone – известняк
Slate – сланец

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Read and translate the text.

Text A

Stone

Building stone is one of the world's most important construction materials. Stone has been used as a building material since the earliest days. It comes from natural stone deposits in the earth and is mines through quarrying. Almost all famous buildings of classic times of the medieval and Renaissance periods and of the eighteenth and early nineteenth centuries were erected of stone. The art of making any structure in stone is called stone masonry. In some places stone was used because of its durability.

Stone is used as crushed stone and dimension stone.

Crushed stone is generally limestone or dolomite that has been crushed and graded by screens to certain size classes. It accounts for about 99 per cent of all building stone. It is widely used in concrete and as a surfacing for roads.

Dimension stone is cut from large blocks and slabs into definite shapes and sizes. It is used most often for finishing and decorating all types of structures. Constructors expect good dimension stone to last more than 100 years. Dimension stone includes granite, limestone, sandstone, marble and slate.

Granite. Granite is very hard, strong and durable. It is used particularly for basements, base courses, columns and steps and for the entire facades. Its colour may be grey, yellow, pink or deep red.

Sandstone. Sandstone is composed of grains of sand or quarts cemented together. Sandstones form one of the most valuable materials. The durability of sandstones depends very largely upon the cementing material. Thus there are different kinds of sandstones. Many types of sandstone are exceptionally hard and are selected for steps, sills, etc. It is an excellent material for concrete aggregate.

Marble. Marble is a crystalline stone chiefly used for decorative purposes. Marble is white, streaked with veins of black, grey, green, pink, red and yellow. Builders use marble to decorate stairways, hearths, floors and as paneling. White and black marbles are used for ornamental decoration where the beauty of the marble is shown to its best advantage.

Limestone. Limestone is a hard and lasting building stone that can be cut easily and shaped with saws, planes, and even lathes. These stones are sometimes placed over the rough stonework of a building to make an attractive surface. Limestone is also used to tile floor, and for sills and steps.

Slate. Slate is fine-grained rock that can be split easily into thin slabs and used for roofing shingles and flagstone flooring.

Comprehension

Exercise 4. Answer the following questions.

1. Do you know that stone has been used as a structural material since the earliest days?
2. What is called stone masonry?
3. Why did people begin to use stone?
4. Can you name the stones used for masonry work?
5. Granite is usually used in construction, isn't it?
6. Does granite possess any special properties?
7. What are these properties?
8. What does the durability of sandstone depend upon?
9. Why are many sandstones selected for steps, sills, etc.?
10. Where is marble chiefly used?
11. Is limestone a soft or hard stone?

Exercise 5. Say if the sentences are true or false.

1. Stone has been used as a building material for two centuries.
2. In some places people used stone because of its durability.
3. Granite is very hard and is used only for basements.
4. There are different colours of granite.
5. Sandstones form one of the most valuable materials.

6. There is only one kind of sandstone.

7. Marble is a crystalline stone chiefly used for basements, columns and steps.

8. Limestone is a soft building stone.

9. Slate is used for decorative purposes.

Vocabulary and Grammar

Exercise 6. Say the same in English.

Строительный материал; сооружать здания; период возрождения; каменная кладка; нехватка древесины; использовать камень; прочность; фундамент; ступени; фасад; цементировать; зависеть от; крайне твёрдый песчаник; бетонный заполнитель; для декоративных целей.

Exercise 7. Find synonyms in the text for the following words:

Famous, structure, due to, lack, normally, foundation, whole, type, to choose, mainly, aim.

Exercise 8. Fill in the gaps using the following words: *facades, the earliest days, granite, marbles, steps, sandstone, grains, stone masonry, valuable, cemented.*

1. Stone has been used as a structural material since _____.
2. The art of making any structure in stone is called _____.
3. _____ is used particularly for basements, base courses, columns and steps and for the entire _____.
4. Sandstone is composed of _____ of sand or quarts _____ together.
5. _____ is an excellent material for concrete aggregate.
6. Sandstones form one of the most _____ materials.
7. _____ are chiefly used for decorative purposes.
8. Limestone is also used to tile floor, and for sills and _____.

Exercise 9. Translate the sentences from Russian into English.

1. Камень использовался в качестве строительного материала с самых ранних времен.
2. Искусство создания любого сооружения из камня называется каменной кладкой.
3. Гранит очень твердый, прочный и долговечный.
4. Цвет гранита может быть серым, желтым, розовым или темно-красным.
5. Долговечность песчаников во многом зависит от цементирующего материала.

6. Существуют различные виды песчаников и многие из них исключительно твердые.

7. Белый и черный мрамор используются для декоративного оформления.

UNIT 3

ARTIFICIAL BUILDING MATERIALS

Lesson 1

Pre-reading task

Exercise 1. Read the words and learn them.

Ferrous – чёрный (металл)
Non-ferrous – цветной (металл)
Iron – железо
Alloy – сплав
To possess – владеть
Luster – глянец, блеск
To forge – ковать
Mercury – ртуть
To melt – плавить(ся)
Cast iron – чугун
To refer to – относиться к
To support – поддерживать
To impose upon – налагать, навязывать
Partition – перегородка
Reinforcement – укрепление, армирование
Corrosion-resistant – устойчивый к коррозии
Stainless – нержавеющий (сталь)
Cutlery – столовые приборы
Furnace – печь, горн
Valve – клапан
Ball-bearing – шарикоподшипник

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Read and translate the text.

Text A

Metals

All metals are divided into ferrous metals and non-ferrous metals. **Ferrous metals** include iron, steel and its alloys. Nonferrous metals are metals and alloys the main component of which is not iron but some other element. Metals, in general, and especially ferrous metals are of good importance in variations.

Metals possess the following properties:

1) All metals have specific metallic luster.
2) They can be forged.
3) Metals can be pulled.
4) All metals, except mercury, are hard substances.
5) They can be melted.
6) In general, metals are good conductors of electricity.

These characteristics are possessed by all metals but the metals themselves differ from one another. Steel and cast iron are referred to the group of ferrous metals. Cast iron is the cheapest of the ferrous metals. It is chiefly used in building for compressed members of construction as the supporting members.

When an engineer designs a steelwork he must carefully consider that steel frame and every part of it should safely carry all the loads imposed upon it. The steel framework must be carefully hidden in walls, floors and partitions. It is steel and metal that is employed as reinforcement in modern ferroconcrete structures.

Steel. There are different kinds of steel. Alloyed steel (or special steel) is corrosion-resistant steel. This kind of steel is widely used in building. Stainless steel is also corrosion-resistant steel. It is used for cutlery, furnace parts, chemical plant equipment, valves, ball-bearing, etc.

Non-ferrous metals. Non-ferrous metals have the following characteristics: high electric and heat conductivity, high corrosion resistance, non-magnetic qualities, light weight.

Aluminium. This is the oldest and best known light metal. It is used in aircraft, automobile, chemical and some other industries.

Copper. Copper is the best conductor of electricity. There are different alloys with copper. An alloy of copper and tin is called bronze. This metal is often used for making various ornaments.

Comprehension

Exercise 4. Answer the following questions.

1. What do ferrous metals include?
2. Is iron the main component of non-ferrous metals?
3. What properties do metals possess?
4. Do the metals themselves differ from one another?
5. Is cast iron the cheapest of the ferrous metals?
6. What must an engineer carefully consider when he designs a steelwork?
7. Where must the steel framework be carefully hidden?
8. Is alloyed steel corrosion-resistant steel?
9. Where is aluminium used?
10. What is the best conductor of electricity?
11. An alloy of copper and tin is called bronze, isn't it?

Exercise 5. Say if the sentences are true or false.

1. Nonferrous metals are iron, steel and its alloys.
2. All metals are hard substances.
3. Metals are good conductors of electricity.
4. Cast iron is mainly used in building for compressed members of construction as the supporting members.
5. Aluminium is used in aircraft, automobile, chemical and some other industries.
6. Copper is the worst conductor of electricity.

Vocabulary and grammar

Exercise 6. Say the same in English.

Лучший проводник электричества; разные сплавы с медью; нержавеющая сталь; специфический металлический блеск; современные железобетонные конструкции; твердые вещества; высокая электрическая и теплопроводимость; стальной каркас; опорные элементы.

Exercise 7. Put the following words in the right column: *component, forge, stainless, general, specific, especially, importance, variation, conductor, ferrous, chiefly, steel, construction, carry, carefully, safely, partition, structure, resistant, melt, equipment.*

NOUN	VERB	ADJECTIVE	ADVERB

Exercise 8. Match the words with their definitions.

1	metal	a	is a form of energy used for heating and lighting
2	luster	b	is a lightweight metal used for making such things as cooking equipment and aircraft parts
3	electricity	c	is gentle shining light that is reflected from a surface
4	steel	d	is a hard substance such as steel, iron, copper and lead
5	copper	e	is a soft reddish-brown metal
6	aluminium	f	is a strong metal made mainly from iron which is used for making bridges, buildings, etc.

Exercise 9. Complete the sentences using the English equivalents for the Russian words in brackets.

1. All metals are divided into (чёрные и цветные).
2. Ferrous metals include (железо, сталь и их сплавы).
3. Copper, aluminium and some other metals are referred to as (цветные металлы).
4. Metals in general and especially ferrous metals are of (большое значение в строительстве).
5. All metals have specific metallic (блеск).
6. All metals, except mercury, are (твёрдые вещества).
7. All metals are good conductors of (электричества).
8. (Чугун) is the cheapest of the ferrous metals.

Exercise 10. Fill in the gaps with an appropriate derivative of the word in brackets.

1. Metals possess _____ properties. (VARY)
2. Cast iron is _____ used as the _____ members in building. (CHIEF, SUPPORT)
3. Alloyed steel is _____ used in building. (WIDE)
4. Non-ferrous metals have high heat _____. (CONDUCT)
5. There are _____ alloys with copper. (DIFFER)

Exercise 11. Translate the sentences from Russian into English.

1. Медь и алюминий относятся к цветным металлам.
2. Все металлы, кроме ртути, твёрдые вещества.

3. Сталь широко используется в строительстве.

4. Сталь также используется в железобетонных конструкциях.

5. Цветные металлы обладают высокой электропроводностью и теплопроводностью, высокой коррозийной стойкостью, немагнитными качествами, малым весом.

6. Алюминий используется в авиационной, автомобильной, химической и некоторых других отраслях промышленности.

7. Медь часто используется для изготовления различных украшений.

Lesson 2

Pre-reading task

Exercise 1. Read the words and learn them.

To lead to – приводить (к чему-либо)
Innovation – новшество, новаторство
Cement – цемент
Limestone – известняк
To grind up – размалывать, измельчать
Composition – состав
Raw material – сырьё
Portland cement – портланд-цемент
To put up – возводить, строить
Blast furnace – доменная печь
Marine – морской
To mix – смешивать
Grading – качество
Girder – перемычка, перекладина
Reinforced concrete – армированный бетон
Dock-wall – подпорная стенка, причал
Beam – балка
Bar – стержень
Mesh – сетка, арматурная сетка
To embed – внедрять
To tamp – набивать, тромбовать
Tensional – упругий
Rigid – жёсткий, негибкий
To expose to – подвергать

To subject to – подвергать
To undergo – подвергаться, испытывать
Shrinkage – сжатие, усадка
Restraining – удерживающий, ограничивающий
Tensile – растяжимый
Moisture – влажность
Stress – напряжение, усилие
To keep in mind – помнить
Homogeneity – однородность

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Read and translate the text.

Text B

Concrete

It is difficult to imagine modern structure without concrete. Concrete is the very building material which led to great structural innovations. The most important quality of concrete is its property to be formed into large and strong monolithic units. The basic materials for making concrete are cement, aggregate and water. Cement is the most essential material and the most important one for making concrete of high quality. Cement is made of limestone and clay. It is burnt (calcined) at high temperature and ground up into powder. Depending on the kind and composition of the raw materials different types of cement are obtained. Portland cement, blast furnace cement are suitable for putting up marine structures.

Concrete is made by mixing cement, water, sand and gravel in the right amount. As soon as it is thoroughly mixed it is poured into forms that hold it in place until it hardens. The crystals forming in the process of making concrete stick together in a very hard artificial stone. Cement starts hardening one hour after the water has been added and the process of hardening lasts for about twenty-eight days. The process is called concrete curing.

The characteristics of concrete depend upon the quality of the materials used, grading the aggregates, proportioning and amount of water. The most important requirements for concrete are: it should be hard, strong, durable, fire-resistant and economical. Concrete can be divided into two classes: mass or plain concrete and reinforced concrete (ferro-concrete) where it is necessary to introduce steel. Plain or mass concrete can be used for almost

all building purposes. Ferro-concrete is used in building bridges and arches, dams and dock-walls, for structures under water, for foundations, columns, girders, beams. The use of concrete and ferro-concrete is almost universal.

Reinforced concrete

Reinforced concrete is a combination of two of the strongest structural materials, concrete and steel. This term is applied to a construction in which steel bars or heavy steel mesh are properly embedded in concrete. The steel is put in position and concrete is poured around and over it, then tamped in place so that the steel is completely embedded. When the concrete hardens and sets, the resulting material gains great strength. This new structural concrete came into practical application at the turn of the 19th century. The first results of the tests of the reinforced concrete beams were published in 1887. Since that time the development of reinforced concrete work has made great progress. And the reasons for this progress are quite evident. Concrete has poor elastic and tensional properties, but it is rigid, strong in compression, durable under and above ground and in the presence or absence of air and water, it increases its strength with age, it is fireproof.

Steel has great tensional compressive and elastic properties, but it is not durable being exposed to moisture, it loses its strength with age, or being subjected to high temperature. So, what is the effect of the addition of steel reinforced to concrete?

Steel does not undergo shrinkage or drying but concrete does and therefore the steel acts as a restraining medium in a reinforced concrete member. Shrinkage causes tensile stresses in the concrete which are balanced by compressive stresses in the steel. For getting the best from reinforced concrete, the following consideration should be kept in mind:

1. For general use the most suitable proportions of cement and aggregate are: one part of cement, two parts of sand and four parts of gravel.

2. Only fresh water free from organic matter should be used for reinforced work. Seawater is not allowed.

3. Homogeneity of the concrete is a very important requirement. Steel constructions with reinforced concrete have become the most important building material invented in centuries and they have given modern architecture its peculiar features.

Comprehension

Exercise 4. Answer the following questions.

1. Is it possible to put up modern structures without using concrete?
2. What is the most important quality of concrete?
3. What is the essential material for making concrete?
4. What is cement made of?
5. What are portland and blast furnace cement suitable for?
6. When does cement start hardening?
7. How long does the process of hardening last?
8. What do the characteristics of concrete depend on?
9. How many classes can concrete be divided?
10. The use of concrete and ferro-concrete is almost universal, isn't it?
11. Is reinforced concrete a combination of two of the strongest structural materials?
12. What is the process of making reinforced concrete?
13. When did this new structural concrete come into practical application?
14. Since when has the development of reinforced concrete work made good progress?
15. What are the properties of concrete?
16. Does concrete increase its strength with age?
17. Does steel undergo shrinkage or drying?
18. What should be kept in mind for getting the best from reinforced concrete?

Exercise 5. Say if the sentences are true or false.

1. Concrete is a natural building material.
2. Cement, aggregate and water are basic materials for making concrete.
3. Cement is made of sand and clay.
4. Concrete is made by mixing limestone, water, sand and gravel in the right amount.
5. Cement starts hardening two hours after the water has been added.
6. Concrete should be hard, strong, durable and fire-resistant.
7. Concrete can be divided into two classes: plain concrete and reinforced concrete.
8. Reinforced concrete is a combination of steel and concrete.
9. It is a construction in which metal bars or heavy steel mesh are properly embedded in cement.
10. This new structural concrete came into practical application at the end of the 19^{th} century.

11. Concrete has bad elastic and tensional properties.
12. Concrete decreases its strength with ages.
13. Steel is durable being exposed to moisture.
14. Steel doesn't lose its strength with ages.
15. Seawater isn't used for reinforced work.
16. Homogeneity of the concrete is a very important requirement.

Vocabulary and Grammar

Exercise 6. Say the same in English.

Глина; песок; бетон высокого качества; современное сооружение; известняк; строительный материал; прочный и долговечный; очень твердый искусственный камень; смесь цемента, воды, песка и гравия; железобетон; процесс затвердевания; вид и состав сырья; перемычки и балки; сталь; процесс изготовления бетона; применять термин; заливать бетон; набирать прочность; быть опубликованным; увеличивать прочность; уменьшать прочность; подвергаться усадке; вызывать растягивающие усилия; важное требование; придавать особые черты; на рубеже 19 века; упругие и растяжимые свойства; современная архитектура.

Exercise 7. Find synonyms in the text for the following words.

Up to date, result in, modernization, significant, big, main, tall, type, various, building, quantity, man-made, to apply, ordinary, basement, to obtain, induration, use, humidity.

Exercise 8. Complete the following table with the appropriate verb or noun form.

Verb	**Noun**
to compress	–
–	construction
–	hardening
–	requirement
to apply	–
to build	–
–	addition
–	moisture
to mix	–

Exercise 9. Put the following words in the right column: ***clay, strong, properly, durable, tamp, shrinkage, essential, concrete, rigid, thoroughly, limestone, steel, compressive, together, elastic, strength, undergo, beam, embed, bar, artificial, mesh, tensional, mixing, make, completely, sand, harden.***

NOUN	VERB	ADJECTIVE	ADVERB

Exercise 10. Complete the sentences using the English equivalents for the Russian words in brackets.

1. The resulting material gains great strength when (он затвердеваает).
2. At the turn of the 19 century new structural concrete (стал применяться).
3. Steel has great tensional compressive and elastic properties but (со временем она теряет прочность).
4. Steel doesn't undergo shrinkage and therefore it acts (как сдерживающая среда).
5. Shrinkage causes tensile stresses in concrete which are balanced (сжимающими усилиями в стали).

Exercise 11. Translate the sentences from Russian into English.

1. Бетон очень важный строительный материал.
2. Основными материалами для изготовления бетона являются цемент, заполнитель и вода.
3. Бетон в течение длительного времени способен становиться прочнее.
4. Прочность, водостойкость, плотность, морозостойкость делают бетон очень хорошим строительным материалом.
5. Цемент начинает затвердевать через час после добавления воды, а процесс затвердевания длится около двадцати восьми дней.
6. Железобетон используется при строительстве мостов и арок, дамб и причалов, для конструкций под водой, для фундаментов, колонн, перемычек и балок.
7. Бетон – это искусственный материал.
8. Бетон получают в результате формирования и затвердения правильно подобранной смеси.
9. В качестве заполнителей применяют различные материалы.
10. Для получения бетона употребляют различный по величине заполнитель.

11. Масса бетона зависит от плотности заполнителя.

12. Однородность бетона является очень важным требованием.

Exercise 12. Read and memorize these dialogues.

Dialogue 1:

- There is something I want to ask you. May I?
- Sure, you may! Why not? Go ahead.
- What is the most important component of concrete?
- Do you mean to say that you don't know?
- Honestly, I don't! Tell me, please!
- OK, listen. The most important component of concrete is cement.

Dialogue 2:

- May concrete be considered an artificial conglomerate (составленный из разных частей) stone?
- Certainly, it may! Why not?
- You know how it is made, don't you?
- Sure, I do. It is made by uniting cement and water into paste.
- What about sand? Isn't sand used?
- Of course, sand is used! How can you make concrete without sand?

Lesson 3

Pre-reading task

Exercise 1. Read the words and learn them.

Rectangular – прямоугольный
Shale – сланец
Resistant – стойкий, прочный
Dampness – сырость
Adhesives – клей, клейкое вещество
Interlocking – взаимное сцепление
Facing brick – облицовочный кирпич
Refractory brick – огнеупорный кирпич

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Read and translate the text.

Text C

Brick

Brick is one of the oldest and most common building materials. It is a rectangular building block made of clay, shale, or various other materials. Bricks are strong, hard and resistant to fire and damage from the weather. They cost relatively little, resist dampness and heat, and can last longer than stone. The colour varies according to the clay used. Some bricks are made of special fireclays for use in fireplaces or ovens. Others may be made of glass or they may be textured or glazed.

A brick is a type of block used to build such structures as houses, commercial and public buildings, pavements, fireplaces and furnaces. The term brick denotes a block composed of dried clay. It is also used informally to denote other chemically cured construction blocks. Bricks can be joined together using mortar, adhesives or by interlocking them. Bricks are produced in numerous classes, types, materials, and sizes which vary with region and time period, and are produced in bulk quantities.

Bricks are divided into two general classes: building bricks and refractory bricks.

Different categories of building bricks are used for load-bearing walls, for structures carrying exceptional loads and where appearance is important. The highest-quality and most attractive building bricks are called facing bricks. They are used in highly visible areas of structures, such as the interior or exterior walls of houses. Facing bricks come in a variety of colours and surface textures. Most are made from high-grade fire clay or low-grade shale.

Refractory bricks can withstand temperatures between 1093° and 2204 °C. They are also highly resistant to chemical damage, physical wear and thermal changes. Refractory bricks are used in a wide variety of structures, including fireplaces and industrial furnaces.

The methods used to make bricks vary according to the raw materials used, the intended use of the bricks and other factors. However, the production of bricks generally involves four basic steps:

1. preparing the ingredients;
2. forming bricks;
3. drying bricks;
4. firing brick.

Comprehension

Exercise 4. Answer the following questions.

1. What is a brick?
2. What properties does a brick have?
3. Do bricks last longer than stone?
4. What does the colour of the brick depend on?
5. What are bricks made of?
6. Where are bricks used?
7. How many classes are bricks divided into?
8. What bricks are called face bricks?
9. What do you know about refractory bricks?
10. Where are refractory bricks used?

Exercise 5. Say if the sentences are true or false.

1. Brick is one of the oldest building materials.
2. Brick is a round building block made of clay, shale, or various other materials.
3. Bricks are used to build various structures.
4. Bricks can be joined together without using mortar.
5. Bricks are divided into building bricks and refractory bricks.
6. Building bricks are used for load-bearing walls and for structures carrying exceptional loads.
7. Facing bricks are the highest-quality and most attractive building bricks.
8. Facing bricks can withstand high temperatures.
9. Refractory bricks are used only for the construction of fireplaces.

Vocabulary and Grammar

Exercise 6. Say the same in English.

Облицовочный кирпич; текстура поверхности; прямоугольный строительный блок; промышленные печи; высокая устойчивость к химическим повреждениям; несущие стены; обжиг кирпича.

Exercise 7. Fill in the gaps using the following words: *thermal, mortar, structures, dampness, dried, refractory, the highest-quality, resistant damage.*

1. Bricks are strong, hard and _____ to fire and damage from the weather.

2. Bricks resist _____ and heat.

3. A brick is a type of block used to build various _____.

4. The term brick denotes a block composed of _____ clay.

5. Bricks can be joined together using _____.

6. There are two general classes of bricks: building bricks and _____ bricks.

7. Facing bricks are _____ and most attractive building bricks.

8. Refractory bricks are highly resistant to chemical _____, physical wear and _____ changes.

Exercise 8. Put the words in the right order to make up a sentence.

1. The / one / brick / of / oldest / is / materials / building.

2. Cost / bricks / little / relatively.

3. Than / bricks / stone / last / can / longer.

4. Bricks / some / may / or / textured / be / glazed.

5. Bricks / facing / areas / in / are / highly / used / visible / structures / of.

6. Withstand / refractory / can / high / bricks / temperatures.

Exercise 9. Translate the sentences from Russian into English.

1. Кирпич – это прямоугольный строительный блок, изготовленный из глины, сланца или различных других материалов.

2. Цвет кирпича варьируется в зависимости от используемой глины.

3. Кирпич используется для строительства таких сооружений, как жилые дома, коммерческие и общественные здания, тротуары, камины и печи.

4. Кирпичи производятся в различных классах, типах, материалах и размерах, которые варьируются в зависимости от региона и периода времени, и производятся в массовых количествах.

5. Огнеупорные кирпичи выдерживают температуру, обладают высокой устойчивостью к химическим повреждениям, физическому износу и температурным изменениям.

6. Методы, используемые для изготовления кирпича, варьируются в зависимости от используемого сырья, предполагаемого использования кирпича и других факторов.

7. Производство кирпича, как правило, включает в себя такие этапы как подготовка ингредиентов, формование, сушка и обжиг кирпичей.

Lesson 4

Pre-reading task

Exercise 1. Read the words and learn them.

Substance – вещество
Constituents – компоненты
Spun – (от глагола spin) плести, сплести
Fragile – хрупкий, ломкий
Transparent – прозрачный
Float glass – листовое стекло, полированное листовое стекло
Plate glass – зеркальное стекло
Glare – сияние, блеск, блик, отблеск
Wire mesh – проволочная сетка
Fiberglass – стекловолокно
Foam glass – пеностекло
Honeycomb – соты
Hollow – полый, пустотелый

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Read and translate the text.

Text D

Glass

Glass is one of the most important and useful materials in the world. Few manufactured substances add as much to modern living as does glass. Yet few products are made of such inexpensive raw materials as silica sand (silica, or silicon dioxide), soda ash (sodium carbonate), and limestone (calcium carbonate). These constituents need to be very pure for the glass to be clear. Glass can take many different forms. It can be spun finer that a spider web or molded into a disk. It can be stronger that steel, or more fragile than paper. Most glass is transparent. Glass can also be colored to any desired shade.

There are many kinds of glass. The float glass is made in the form of flat sheets. It is used chiefly in windows, in mirrors, room dividers. It provides the best qualities of the old plate glass with more than ten times the productivity of the plate glass process. It is also significantly more energy

efficient and can be produced in a full range of thicknesses. The electro-float process led to the mass production of solar-control glass or tinted windows, which reduce solar heat gain and glare in buildings. One of the newer and most fascinating products of glass manufacture is fiber glass. It can be laminated with plastics or toughened, or a wire mesh can be sandwiched into glass sheets to provide strength or fire-resistant properties. Fiberglass insulates the walls of many homes. Foam glass, when it is cut, looks like a black honeycomb. It is filled with many tiny cells of gas. Each cell is surrounded and sealed off from the other by thin walls of glass. Foam glass is so light that it floats on water, like cork. It is widely used as a heat insulator in buildings, on steam piper, and on chemical equipment. Foam glass can be cut into various shapes with a saw.

Glass building blocks are made of two hollow half-sections sealed together at a high temperature. Glass building blocks are good insulators because they withstand high temperatures on the inside and low, outdoor temperatures at the same time, because of the dead-air space inside thus making suitable block for building purposes. Glass building blocks are laid like bricks.

Comprehension

Exercise 4. Answer the following questions.

1. What role does glass play in modern life?
2. What forms can glass take?
3. Is glass a strong or fragile material?
4. Glass can be coloured, can't it?
5. How many types of glass are there?
6. Where is the float glass used?
7. What is fiberglass? What is it used for?
8. What does foam glass look like?
9. What are glass building blocks made of?

Exercise 5. Say if the sentences are true or false.

1. Glass is one of the most important materials in the world, which makes a great contribution to modern life.
2. Silica sand, soda ash and limestone need to be very pure for the glass to be clear.
3. Glass can be as strong as steel.
4. Glass can have different shades.
5. The float glass is used chiefly in windows.

6. Fiberglass insulates the walls of many homes.
7. The foam glass is very heavy.
8. Glass building blocks are good insulators.

Vocabulary and Grammar

Exercise 6. Say the same in English.

Промышленные вещества; кварцевый песок; желаемый оттенок; стеклянные строительные блоки; из-за мертвого воздушного пространства внутри; процесс электроплавления; тонированные окна; множество крошечных газовых ячеек; обеспечение прочности или огнестойкости; недорогое сырье.

Exercise 7. Put the words in the right order to make up a sentence.

1. Take / can / many / different / glass / forms.
2. Can / than / glass / be / steel / stronger.
3. Are / glass / of / many / there / kinds.
4. Insulates / fiberglass / walls / homes / of / the / many.
5. Building / insulators / glass / are / good / blocks.

Exercise 8. Put the following words in the right column: *insulate, temperature, pure, productivity, reduce, energy, strength, fragile, useful, chiefly, productivity, significantly, thickness, inexpensive, heat, chemical, suitable, substance, efficient, widely, shape, provide, glass, steel, transperant.*

NOUN	VERB	ADJECTIVE	ADVERB

Exercise 9. Make up word combinations and translate them.

1. high	a. space
2. building	b. piper
3. good	c. heat
4. hollow	d. temperature
5. foam	e. blocks
6. fire-resistant	f. cells
7. tiny	g. production
8. dead-air	h. insulators
9. solar	i. half-sections
10. mass	j. glass
11. steam	k. properties

Exercise 10. Translate the sentences from Russian into English.

1. Стекло – один из самых важных и полезных материалов в мире.
2. Стекло может быть более хрупким, чем бумага.
3. Листовое стекло значительно более энергоэффективно и может быть изготовлено в полном диапазоне толщин.
4. Проволочная сетка может быть вставлена в стеклянные листы для обеспечения прочности или огнестойкости.
5. Пеностекло широко используется в качестве теплоизолятора в зданиях и на паропроводах.
6. Тонированные окна уменьшают приток солнечного тепла и блики в зданиях.
7. Пеностекло можно разрезать на различные формы.
8. Стеклянные строительные блоки выдерживают одновременно высокие температуры внутри и низкие температуры наружного воздуха.

Lesson 5

Pre-reading task

Exercise 1. Read the words and learn them.

Porcelain – фарфор; фарфоровые изделия
Withstand – выдерживать
Feldspar – полевой шпат
Silica – кварц
Talc – стеатит
Earth's crust – земная кора
Insulator – изолятор; изоляционный материал; непроводник
Conduct – поводить
Dinnerware – посуда
Refractory – огнеупорный материал

Exercise 2. Make up your own sentences with the words given above. Use as many sentences as possible.

Exercise 3. Read and translate the text.

Text E

Ceramics

Ceramics are one of the most important types of engineering materials that are primarily synthetic. The other two are metals and plastics. Ceramics include such everyday materials as brick, cement, glass, and porcelain. Most ceramics are hard and can withstand heat and chemicals. These properties give them a wide variety of uses in industry.

Manufacturers make common ceramics from such minerals as clay, feldspar, silica, and talc. These minerals called silicates form most of the earth's crust. Clay is an important silicate. But it is not used in all ceramic materials. Glass, for example, is made from sand. Most ceramic products, like their mineral ingredients, can withstand acids, gases, salts, water, and high temperatures. But not all ceramic products have the same properties. Common ceramics are good insulators – that is, they conduct electricity poorly. However, certain ceramics lose their electrical resistance and become superconductors when they are cooled. Some ceramic materials are magnetic.

The properties of ceramics make them especially suitable for certain products. Products made of ceramic materials include abrasives (materials used for grinding), construction materials, dinnerware, electrical equipment, glass products, and refractories (heat-resistant materials).

Comprehension

Exercise 4. Answer the following questions.

1. Are ceramics natural or artificial building materials?
2. What everyday materials do ceramics include?
3. What do you now about the properties of ceramics?
4. Is clay used in all ceramic materials?
5. Are common ceramics good or bad insulators?
6. When do certain ceramics lose their electrical resistance?

Exercise 5. Say if the sentences are true or false.

1. Ceramics can't withstand heat.
2. All ceramic products have the same properties.
3. Common ceramics conduct electricity well.
4. Certain ceramics lose their electrical resistance when they are cooled.
5. Some ceramic materials are magnetic.

Vocabulary and Grammar

Exercise 6. Say the same in English.

Электрическое сопротивление; плохо проводит электричество; огнеупорный материал; абразивы; сверхпроводники; хорошие изоляторы; фарфор; выдерживать жару; материалы, используемые для шлифования; широкое применение в промышленности; электрооборудование; кислоты.

Exercise 7. Fill in the gaps using the following words: *temperatures, withstand, insulators, ceramic, superconductors, equipment, glass, suitable.*

1. Ceramics include such materials as brick, cement, _____, and porcelain.
2. Most ceramics are hard and can _____ heat and chemicals.
3. Common ceramics are good _____.
4. Clay is not used in all _____ materials.
5. Most ceramic products can withstand high _____.
6. When certain ceramics are cooled they become _____.
7. The properties of ceramics make them especially _____ for such products as construction materials, dinnerware, electrical _____, glass products, and refractories.

Exercise 8. Put the following words in the right column: *electrical, insulator, resistance, poorly, important, withstand, synthetic, porcelain, feldspar, high, electricity, lose, magnetic, equipment, primarily, product, glass.*

NOUN	VERB	ADJECTIVE	ADVERB

Exercise 9. Match the synonyms.

1. synthetic	a. similar
2. primarily	b. characteristic
3. the same	c. strong
4. hard	d. fireproof
5. important	e. isolator
6. refractory	f. mainly
7. insulator	g. artificial
8. property	h. essential

Exercise 10. Translate the sentences from Russian into English.

1. Керамика является одним из важнейших видов синтетических инженерных материалов.
2. Большая часть керамики прочна и выдерживает воздействие тепла и химических веществ.
3. Производители изготавливают обычную керамику из таких минералов, как глина, полевой шпат, кремнезем и тальк.
4. Большинство керамических изделий выдерживают воздействие кислот, газов, солей, воды и высоких температур.
5. Некоторые виды керамики теряют свое электрическое сопротивление и становятся сверхпроводниками при охлаждении.
6. Свойства керамики делают их особенно подходящими для таких изделий как абразивы, строительные материалы, посуда, электрооборудование, изделия из стекла и огнеупоры.

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