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ИНОСТРАННЫЙ ЯЗЫК
АНГЛИЙСКИЙ ЯЗЫК ДЛЯ СТУДЕНТОВ
СТРОИТЕЛЬНЫХ СПЕЦИАЛЬНОСТЕЙ

*Методические указания к практическим занятиям
для студентов бакалавриата направления 21.03.02*

FOREIGN LANGUAGE
ENGLISH FOR CONSTRUCTION STUDENTS

САНКТ-ПЕТЕРБУРГ
2019

УДК 621.316.722;621.316.1 (073)

ИНОСТРАННЫЙ ЯЗЫК. Английский язык для студентов строительных специальностей: Методические указания к практическим занятиям / Санкт-Петербургский горный университет. Сост. *Ю.В. Борисова*. СПб, 2019. 36 с.

Предлагаемый материал направлен на совершенствование навыков и умений просмотрового и изучающего чтения профессионально-ориентированных текстов с последующим использованием полученной информации в речи, а также на развитие навыков самостоятельной работы с аутентичными текстами. Методические указания могут быть использованы во время практических занятий со студентами 2-го курса.

Методические указания предназначены для студентов бакалавриата направления 21.03.02 «Землеустройство и кадастры» профиля «Городской кадастр». Согласованы с программой по иностранному языку для студентов неязыковых вузов.

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ПРЕДИСЛОВИЕ

Данные методические указания предназначены для учебно-методического сопровождения курса английского языка для студентов неязыковых вузов, обучающихся по направлению подготовки 21.03.02 «Землеустройство и кадастры» профиль: «Городской кадастр».

Изучение материала преследует цель развития навыков и умений просмотрового и изучающего чтения текстов по направлению подготовки, а также их перевода на русский язык с последующим использованием полученной информации для речевой практики; овладение студентами иноязычной коммуникативно-речевой компетенцией, позволяющей будущему специалисту осуществлять профессиональную коммуникацию; формирование активного словарного запаса, который включает наиболее употребительные английские термины и слова общетехнического характера.

Методические указания состоят из тематических разделов, каждый из которых посвящен одному из аспектов, связанных с общестроительной специализацией. Задания для чтения и перевода составлены на материале аутентичных текстов и сопровождаются упражнениями, направленными на активизацию когнитивной деятельности обучающихся, освоение нового лексического материала, и способствуют развитию коммуникативных навыков в сфере профессионального общения на английском языке.

UNIT 1. CONSTRUCTION

Task 1. Before you read Text A "Building Engineering as a Discipline", discuss these questions with your groupmates or teacher.

- a) Do you know how building construction began?
- b) Is there any difference between civil engineering and building engineering?
- c) Is building engineering a big subject?
- d) Why is building engineering very important in modern life?
- e) What building engineering courses are usually taught at higher educational institutions?
- f) What degrees do building engineering academic programmes provide?

Task 2. Read Text A to find out if your answers are right or wrong. The following phases may be helpful: Quite so. Exactly. It's (partly) true. Just the opposite. I don't think so. That's right. That's wrong.

TEXT A

Building Engineering as a Discipline

Building construction is an ancient human activity. It began with the purely functional need for a controlled environment to moderate the effects of climate. Constructed shelters were one means by which human beings were able to adapt themselves to a wide variety of climates and become a global species.

Building construction today is a significant part of industrial culture, a manifestation of its diversity and complexity and a measure of its mastery of natural forces, which can produce a widely varied built environment to serve the diverse needs of society.

Education in the field of Building Engineering as one of the areas of civil engineering is the study of the integrated application of engineering principles and technology to building design and architecture. Building engineering is an interdisciplinary engineering subject that offers a

general engineering approach to the planning, design, construction, operation, renovation, and maintenance of buildings, as well as with their impacts on the surrounding environment. The discipline requires pertinent knowledge integrated from traditional well-established disciplines: civil engineering for building structures and foundation; mechanical engineering for heating, ventilation and air-conditioning system (HVAC), and for mechanical service systems; physics for building science, lighting and acoustics; electrical engineering for power distribution and control; chemistry and biology for indoor air quality; architecture for form, function and specifications; economics for project management.

Building engineering students are ideally trained in all phases of the life cycle of a building, and learn to appreciate buildings as an advanced technological system requiring close integration of many subsystems and their individual components. Technical problems and appropriate solutions are studied to improve the performance of the building in areas, such as energy efficiency, construction management, HVAC and control systems, advanced building materials, earthquake resistance, wind effects on buildings, computer-aided design.

The building engineering graduate may work as a consulting engineer, design engineer, project manager, construction manager, cost engineer, facility manager, conservation-utility director, engineer, operation manager, process engineer, or in research and development, among other career possibilities.

Building engineering academic programmes normally provide an accredited academic degree. The completed degree may be designated as a Bachelor of Engineering, Bachelor of Science, Bachelor of Technology or Bachelor of Applied Science depending upon the university or institute. The length of study is four years and the programme consists of basics of engineering and sciences (technical drawing, engineering mechanics, mechanics of materials, thermodynamics, mathematics, computer programming, surveying), subjects in building engineering sciences

(structural analysis and design, soil mechanics, building engineering systems, building economics, construction management, thermal environment and building service systems). In some programmes, elective courses allow students to specialize in one or more sub-disciplines.

Graduates may pursue a postgraduate degree, such as a Master of Engineering, Master of Applied Science, an Engineer's degree, or a Doctor of Philosophy in Engineering. The Master and Engineer's degree may consist of either research, coursework or a mixture of the two. The Doctor of Philosophy consists of a significant research component and it is often viewed as the entry point to academia.

Task 3. Skim Text B "History of the Building Industry" and try to understand what it is about. Give a brief overview of its structure and contents.

TEXT B

History of the Building Industry

In early times there were few specialist builders. People constructed their homes from whatever material was available where they lived. The only large buildings were communal ones such as granaries and places of worship for their gods. In ancient Egypt, Greece, and Rome, large buildings were financed by the rulers of the country and built by slaves who had been captured in battle. Stone was used if it was available and where it was not, brick-making industry developed.

After the end of the Roman Empire in the 4th century AD there was very little large-scale building done in Europe for about six hundred years. There were two kinds of buildings other than cottages and farm buildings: castles and churches. Building a cathedral was such a vast undertaking that someone was required to organize all the craftsmen needed for the work. This was usually a master stonemason.

At the time of the Renaissance in the 15th and 16th centuries a new sort of building specialist emerged. He was usually a philosopher or artist, rather than a craftsman, who would get together a team of building workers and make arrangements to pay them. This was the beginning of the profession of architecture.

The Industrial Revolution in the 19th century brought to an end the craft traditions in building. Many new functional buildings were put up in the big towns that were developing — buildings that were not planned to be beautiful but were there to house machinery and the workers who operated it. They had to be built quickly and cheaply. The building materials were brought across the country on the new canals and railways that were quickly constructed to get the raw materials for industry and the finished products to the places where they were needed.

When the railways were built, tunnels were dug, and bridges, aqueducts, and roads were built. New materials such as steel were introduced and engineers were trained to use them. Advances in science meant that building designers could calculate in advance how a building should be constructed to ensure that it would stand up, instead of relying on a system of trial and error, for it sometimes happened that a building would collapse while it was being built.

It was important to calculate accurately the cost of materials and labour, and there came to be so much competition for doing the work that a system of tendering developed. Different contractors would calculate what it would cost to complete a project and then the lowest estimate would be chosen. The quantity surveyor emerged in the late 19th century as a professional specialist in building finance, who could accurately predict the cost of a project.

In the late 19th century, all kinds of new technological developments affected the building industry. The emergence of the skyscraper in Chicago, United States, was made possible not only by the use of steel

framing in the structure, but also by the invention of the elevator, the telephone, and air conditioning.

The present state of building construction is complex. There is a wide range of building products and systems which are aimed primarily at groups of building types or markets. The design process for buildings is highly organized and draws upon research establishments that study material properties and performance, code officials who adopt and enforce safety standards, and design professionals who determine user needs and design a building to meet those needs. The construction process is also highly organized; it includes the manufacturers of building products and systems, the craftsmen who assemble them on the building site, the contractors who employ and coordinate the work of the craftsmen, and consultants who specialize in such aspects as construction management, quality control, and insurance.

Task 4. Complete the sentences choosing the best variant corresponding to the contents of Text B.

Building construction for several apartment blocks

1) In early times people constructed their homes from

- a) stone available.
- b) any material available.
- c) bricks.

2) At the time of the Renaissance in the 15th and 16th centuries a new sort of building specialist was

- a) a master stonemason.
- b) a craftsman.
- c) an artist.

3) In the 19th century advances in science meant that

- a) a system of trial and error was relied on.
- b) design calculations were introduced.
- c) new materials began to be used.

- 4) The construction of the skyscraper was made possible by
- a) the use of steel framing, the invention of the elevator, the telephone, and air conditioning.
 - b) the use of steel framing.
 - c) the invention of the elevator and air conditioning.
- 5) Now the construction process is highly organized because
- a) it includes the manufacturers of building products.
 - b) it involves design professionals.
 - c) it involves different sorts of building experts.

UNIT 2. ARCHITECTURE

Task 1. Read and translate the text

Architecture: Its Forms and Functions

Architecture is the art or science of planning, building and structures. Without consideration of structural principles, materials, social and economic requirements a building cannot take form. But without aesthetical quality inherent in its form a building cannot be considered as a work of architecture as well. From the very beginning of construction in human history lots of architectural skills, systems and theories have been evolved for the construction of the buildings, which have housed nations and generations of people in any kind of their activity. Writings on architecture are almost as old as writing itself. Books on the theory of architecture, on the art of buildings, and on the aesthetical view of buildings exist in great number. The oldest book, which sets forth the principles, upon which buildings should be designed and which aim is to guide the architect, is the work of Markus Vitruvius Pollio written in the first century B. C.

Architecture is an art. Its nowadays expression should be creative and consequently new. The heritage of the past cannot be ignored, but it must be expressed in modern terms. There exists an evident paradox in the coexistence

of change and survival in every period of human civilisation. This paradox of change and repetition is clearly illustrated in any architectural style.

Architecture is also the style or manner of building in a particular country or period of history. There are widely known examples of Gothic architecture all round the globe. During many centuries mankind admires the architecture of ancient Greece or Roman Empire as well.

There are three basic factors in architecture. They are convenience, strength and beauty. These three factors have been present and are always interrelated in the best constructions till the 21st century. No true architect could think of any of them³ without almost automatically considering the other two as well. Thus, architectural design entails not only the necessity to study various solutions for convenience, structure, and appearance as three separate processes.

Architectural design also includes the necessity to keep in mind the constant interaction of these factors. It's impossible for an architect first plan a building from the point of view of convenience, and then make the design of a strong construction around his plan to shelter it. Then, as a final touch, try to adjust and decorate the whole to make it pretty. Any design evolving from such kind of work will produce only a confused, incoherent, and unsatisfactory building. When speaking about any truly great building we cannot but say that every element in it has a triple implication or significance. This triple nature of architectural design is one of the reasons why architecture is a difficult art. It needs some unique type of imagination⁴ as well as long years of training and experience to make a designer capable of getting requite in the light of these three factors—use, construction, and aesthetic effect—simultaneously. The designer must have a good knowledge as of engineering so of building materials. This knowledge will enable him to create economically strong and practical construction. The designer, in addition, must possess the creative imagination, which will enable him to integrate the plan and the construction into the harmonious whole.

The architect's feeling of satisfaction in achieving such integration is one of his/her (their) greatest rewards.

Task 2. Phonetic Test. Read the following words correctly

pseudo-concrete, honour, chancellor, quote, fluent, psychology, champagne, bath, asphalt, psalm, guide, chronicles, chef, technology, basic, architecture, guestion.

Task 3. Word construction

3.1. Translate the words keeping in mind their suffixes and prefixes

necessary — necessitate — necessity

evolve — evolutive — evolution — evolutionist — evolutionary — evolutionary

architect — architectonic — architectonics — architectural — architecture

3.2. Memorise the words with the same stem

stuff — ' stuffy — ' stuffiness

intro' duce — intro' duction — intro' ductory

' person — ' personal — ' personage — personality — per' sonify

— ' personable — ' personally — personofi' cation — ' personate

Task 4. Answer the questions to the text

1. What is architecture?
2. What is the oldest book to set forth the principles of construction?
3. How should mankind deal with the heritage of the past?
4. What three basic factors in architecture were listed nearly two thousand years ago?
5. Why architecture is a difficult art?
6. What can we say about any truly great building?
7. What integration must an architect achieve?
7. Let us talk about architecture.

Task 5. Answer the questions

1. What famous Russian/English architects do you know?

2. Among Seven Wonders of the World there were some famous buildings and constructions. Do you know them?
3. What famous architectural complexes in Russia do you know?
4. What do you think about your city/town architecture?

UNIT 3. TRADITIONAL BUILDING MATERIALS

Task 1. Read each word or word combination aloud. Mind the stress. Find the meaning.

bark, bole, brick, brush, building block, building materials, building technique, bulk material, carpentry, cement, clay, cob, compressed earth block, concrete mix, convert, dense, drawback, dry stone wall, dung, engineered wood, finishing, grass, habitat, hardwood, heating resource, hew, insulation, insulator, leaf, lean-to, light-frame, lime, log, lumber, masonry brickwork, masonry work, moisture, monolithic, mortar, non load bearing wall, plant, plaster, plumbing, rammed earth, rock, roofing work, sand, saw, sod, softwood, split, strength, structural, thatch, thermal, timber, timber frame, trunk, twig, wattle and daub, wikiup, wood

Task 2. Read the text silently, trying to grasp all the details of the contents. After that read the text aloud and translate it from English into Russian.

Building materials are any materials which are used for construction purposes. Many naturally occurring substances, such as clay, rocks, sand, and wood, even twigs and leaves, have been used to construct buildings. Apart from naturally occurring materials, many man-made products are in use, some more and some less synthetic. The manufacture of building materials is an established industry in many countries and the use of these materials is typically segmented into specific specialty trades, such as carpentry, insulation, plumbing, and roofing work. They provide the make-up of habitats and structures including homes.

Brush structures are built entirely from plant parts and are generally found in tropical and sub-tropical areas, such as rainforests, where very large leaves can be used in the building. These are built mostly with branches, twigs and leaves, and bark, similar to a beaver's lodge. These were variously named wickiups, lean-tos, and so on.

An extension on the brush building idea is the wattle and daub process in which clay soils or dung, usually cow, are used to fill in and cover a woven brush structure. This gives the structure more thermal mass and strength. Wattle and daub is one of the oldest building techniques. Many older timber frame buildings incorporate wattle and daub as non load bearing walls between the timber frames.

Clay based buildings usually come in two distinct types. One being solid monolithic structural walls such as Rammed earth, sod, and cob. The other being walls built by stacking building blocks or bricks by forming the clay mixture into individual units which are then dried or fired, examples include compressed earth blocks and masonry brickwork.

Sand is used with cement, and sometimes lime, to make mortar for masonry work and plaster. Sand is also used as a part of the concrete mix.

Rock structures have existed for as long as history can recall. It is the longest lasting building material available, and is usually readily available. There are many types of rock throughout the world, all with differing attributes that make them better or worse for particular uses. Rock is a very dense material so it gives a lot of protection too; its main drawback as a material is its weight and awkwardness. Its energy density is also considered a big drawback, as stone is hard to keep warm without using large amounts of heating resources.

Dry stone walls have been built for as long as humans have put one stone on top of another. Eventually, different forms of mortar were used to hold the stones together, cement being the most commonplace now.

Stone buildings can be seen in most major cities; some civilizations built entirely with stone such as the Egyptian and Aztec pyramids and the remains of the Inca civilization.

Thatch is one of the oldest of building materials known; grass is a good insulator and easily harvested.

Wood has been used as a building material for thousands of years in its natural state. Today, engineered wood is becoming very common in industrialized countries.

"Timber" is the term used for construction purposes except the term "lumber" used in the United States. Wood (a log, a trunk, a bole) becomes timber when the wood has been "converted" (sawn, hewn, split) in the forms of minimally-processed logs stacked on top of each other, timber frame construction, and light-frame construction. The main problems with timber structures are fire risk and moisture-related problems.

Softwood is used a lower-value bulk material, whereas hardwood is usually used for finishings and furniture.

Task 3. Do the following statements agree with the information given in the text?

Write

TRUE if the statement agrees with the information
FALSE if the statement contradicts the information

Correct the false statements.

1. Building materials are materials used to construct buildings.
2. Naturally occurring substances are not used to construct buildings.
3. The manufacture of building materials is an established industry in many countries.
4. Brush structures are built from man-made materials.
5. Wattle and daub is one of the modern building techniques.
6. Many older timber frame buildings incorporate wattle and daub as load bearing walls between the timber frames.
7. Clay based buildings have either solid monolithic walls or the walls built by stacking building blocks or bricks.
8. Sand is used as a part of concrete mix.
9. Rock is a very dense material so it gives little protection.
10. Different forms of mortar are used to hold stones together.
11. Stone buildings can be seen in most major cities.
12. Thatch is one of the oldest known building materials.
13. Nowadays engineered wood is becoming very common in developing countries.

14. Wood becomes timber when it has been sawn, hewn or split in the forms of minimally-processed logs.
15. Hardwood is used as a lower-value bulk material, whereas softwood is usually used for finishings and furniture.

Task 4. Answer the following questions. Practice the questions and the answers with your partner.

1. What are building materials?
2. Can you show any examples of naturally occurring substances used as building materials?
3. In what trades is the use of building materials typically segmented?
4. What types do clay based buildings come into?
5. What is sand used for?
6. How long have rock structures existed?
7. What kind of building material is rock?
8. What is mortar used for?
9. What ancient civilizations were built entirely with stone?
10. How long has wood been used as a building material?
11. In what countries is engineered wood becoming very common today?
12. What does "timber" mean?

Task 5. Translate into English.

1. Строительными материалами являются любые конструкционные материалы, используемые в строительстве.
2. Камень, песок, глина, дерево являются природными строительными материалами.
3. Цемент, сталь, стекло, пластик относятся к искусственным строительным материалам.
4. Строительные материалы необходимы, в частности, для плотницких изолировочных, сантехнических, кровельных и других работ.
5. Глина используется как для изготовления кирпичей, так и для возведения глинобитных стен.
6. Песок применяется для приготовления бетона, а также для при-

готовления строительных растворов.

7. Каменные строения существуют с незапамятных времен.
8. Камень - готовый прочный и долговечный строительный материал.
9. Каменные стены складываются как на растворе, так и «насухо», т.е. без раствора.
10. В строительстве широко используются пиломатериалы.

UNIT 4. MODERN BUILDING MATERIALS

Task 1. Read and translate each word or word combination.

Abundance, adaptability, additive, brittle, bulletproof glass, byproduct, ceiling, composition, corrosion, curtain wall, earthquake, resistance, emittance, external surface, extrude, FGD gypsum, fiber (fibre), fibreglass, fibrous, film, fire-resistance, foam, glass pane, glass-making, gypcrete, gypsum, plaster, hardness, heat tolerance, industrial application, insulator, kiln, lateral resistance, lightness, load bearing, longevity, malleable, mold, panel, phospho gypsum, plaster, plasticity, plastic, polymerization product, polystyrene, polyurethane, prefabricated structure, Quonset hut, recyclable, resiliency, roving, semi-synthetic, shear, resistance, silicate, synthetic, space frame, thermal property, uniformity, window

Task 2. Read the text and translate it from English into Russian.

Recently, synthetic polystyrene or polyurethane foam has been used in combination with structural materials, such as concrete. It is lightweight, easily shaped, and an excellent insulator. Foam is usually used as part of a structural insulated panel, wherein the foam is sandwiched between wood or cement or insulating concrete forms.

Glassmaking is considered an art form as well as an industrial process or material.

Clear windows have been used since the invention of glass to cover small openings in a building. Glass panes provided humans with the

ability to both let light into rooms while at the same time keeping inclement weather outside.

Glass is generally made from mixtures of sand and silicates, in a very hot fire stove called a kiln, and is very brittle. Additives are often included in the mixture used to produce glass with shades of colors or various characteristics (such as bulletproof glass or light emittance).

The use of glass in architectural buildings has become very popular in the modern culture. Glass "curtain walls" can be used to cover the entire facade of a building, or it can be used to span over a wide roof structure in a "space frame". These uses though require some sort of frame to hold sections of glass together, as glass by itself is too brittle and would require an overly large kiln to be used to span such large areas by itself.

Gypcrete is a mixture of gypsum plaster and fibreglass rovings. Although plaster and fibres fibrous plaster have been used for many years, especially for ceilings, it was not until the early 1990s that serious studies of the strength and qualities of a walling system Rapidwall, using a mixture of gypsum plaster and 300mm plus fibreglass rovings, were investigated. It was discovered, through testing at the University of Adelaide, that these walls had significant, load bearing, shear and lateral resistance together with earthquake-resistance, fire-resistance, and thermal properties. With an abundance of gypsum (naturally occurring and by-product chemical FGD and phospho gypsums) available worldwide, gypcrete-based building products, which are fully recyclable, offer significant environmental benefits.

Metal is used as structural framework for larger buildings such as skyscrapers, or as an external surface covering. There are many types of metals used for building. Metal figures are shaped quite prominently in prefabricated structures such as the Quonset hut. They can be seen in most cosmopolitan cities. It requires a great deal of human labor to produce metal, especially in the large amounts needed for the building industries. Corrosion is metal's prime enemy when it comes to longevity.

The term "plastics" covers a range of synthetic or semi-synthetic organic condensation or polymerization products that can be molded or extruded into objects, films, or fibers. Their name is derived from the fact that in their semi-liquid state they are malleable, or have the property of plasticity. Plastics vary immensely in heat tolerance, hardness, and resiliency. Combined

with this adaptability, the general uniformity of composition and lightness of plastics ensures their use in almost all industrial applications today.

Task 3. Do the following statements agree with the information given in the text?

Write

TRUE *if the statement agrees with the information*

FALSE *if the statement contradicts the information*

Correct the false statements.

1. Since Adam was a boy, synthetic polystyrene or polyurethane foam has been used in combination with structural materials, such as concrete.
2. Foam is usually used as a structural insulated panel, wherein wood is sandwiched between the foam or cement.
3. Clear windows have been used since the invention of glass to cover large openings in a building.
4. Glass panes provided humans with the ability to both let light into rooms while at the same time keeping inclement weather outside.
5. Glass is generally made from mixtures of sand and silicates, in a very hot fire stove called a kiln.
6. Glass "curtain walls" can be used to cover the entire facade of a building, or it can be used to span over a wide roof structure in a "space frame".
7. Gypcrete is a mixture of gypsum plaster and fiberglass grains.
8. It was not until the early 1990s that plaster and fibrous plaster were investigated.
9. Metal is used as structural framework for larger buildings such as skyscrapers, or as an external surface covering.
10. There are few types of metals used for building.
11. Metal figures, such as the Quonset hut, can hardly be seen **in** most cosmopolitan cities.
12. The term "plastics" covers a range of synthetic or semi-synthetic organic condensation or polymerization products that can be molded or extruded into objects, films, or fibers.
13. The name "plastics" is derived from the fact that in their semi-liquid state

they are malleable, or have the property of plasticity.

14. Plastics vary immensely in heat tolerance, hardness, and resiliency.

15. Plastics are widely used in almost all industrial applications today.

Task 4. Answer the following questions. Practice the questions and the answers with your partner.

1. What kind of foam has been recently used in combination with structural materials, such as concrete?

2. What useful properties does foam have?

3. What is foam usually used for?

4. How long have clear windows been used?

5. What is glass made from?

6. What functions can glass "curtain walls" perform?

7. What is gypcrete?

8. What is metal used for?

9. What effect does corrosion have on metal?

10. What are plastics? What useful properties do plastics have?

Task 5. Translate into English.

1. Пенополистирол и пенополиуретан - современные теплоизоляционные материалы.

2. Пеноматериалы используют в качестве изолирующей прослойки в деревянных, каменных и бетонных конструкциях.

3. Окна обеспечивают естественное освещение, тепло- и звукоизоляцию помещений.

4. Для изготовления стекла используют кварцевый песок.

5. Стекло - очень хрупкий материал.

6. Конструкции из стекла используют для сооружения стен вдоль фасадов зданий и для устройства крыш.

7. Гипрок - материал, изготовленный на основе смеси гипсового раствора и пучков стекловолокна.

8. Металл используется не только как конструкционный, но и как облицовочный материал.

UNIT 5. CIVIL AND INDUSTRIAL ENGINEERING

Task 1. Translate the extract into Russian.

Civil engineering is a professional engineering discipline that deals with the design, construction, and maintenance of the physical and naturally built environment, including works like roads, bridges, canals, dams, and buildings.

Civil engineering is the oldest engineering discipline after military engineering, and it was defined to distinguish non-military engineering from military engineering. It is traditionally broken into several sub-disciplines including environmental engineering, geotechnical engineering, geophysics, geodesy, control engineering, structural engineering, transportation engineering, earth science, atmospheric sciences, forensic engineering, municipal or urban engineering, water resources engineering, materials engineering, offshore engineering, quantity surveying, coastal engineering, surveying, and construction engineering.

Civil engineering takes place on all levels: in the public sector from municipal through to national governments, and in the private sector from individual homeowners through to international companies.

Task 2. Answer the following questions.

1. What do you know about civil engineering?
2. Do you know any sub-disciplines of non-military engineering?
3. What does «forensic engineering» mean?

Task 3. Translate the following words. Make up your own sentences with them on the topic of the text.

To deal with; design; maintenance; to distinguish; sub-disciplines; public sector; private sector; environment; to include; civil engineering.

Task 4. Read the text below and give Russian equivalents for the following English word combinations.

To make a product; to provide a service; to increase productivity; management of people; to maximize efficiency; product requirements; to meet the requirements; management control systems; to ensure product quality; to promote worksite; to evaluate hazardous conditions.

Industrial Engineering

Industrial engineers determine the most effective ways to use the basic factors of production—people, machines, materials, information, and energy—to make a product or provide a service.

They are concerned primarily with increasing productivity through the management of people, methods of business organization, and technology.

To maximize efficiency, industrial engineers study product requirements carefully and then design manufacturing and information systems to meet those requirements with the help of mathematical methods and models.

They develop management control systems to aid in financial planning and cost analysis, and they design production planning and control systems to coordinate activities and ensure product quality.

They also design or improve systems for the physical distribution of goods and services and determine the most efficient plant locations. Industrial engineers develop wage and salary administration systems and job evaluation programs. Many industrial engineers move into management positions because the work is closely related to the work of managers.

The work of health and safety engineers is similar to that of industrial engineers in that they deal with the entire production process. Health and safety engineers promote worksite or product safety and health by applying knowledge of industrial processes, as well as mechanical, chemical, and psychological principles. They must be able to anticipate, recognize, and evaluate hazardous conditions as well as develop

hazard control methods. They also must be familiar with the application of health and safety regulations.

Task 5. Write a brief report on famous and the most interesting structures all over the world, their designers and constructors, some interesting facts about their life.

Task 6. Prepare an oral presentation about your future profession using the previous texts.

UNIT 6. UNDERGROUND STRUCTURES

Task 1. Read each word or word combination aloud. Mind the stress. Find the meaning.

Air conditioning, blasthole drilling, caisson, cold storage chamber, construction method, cross bracing, cutter loader, design, deviation, draw-down, earth's surface, foundation pit, hydrogeological, interlocked reinforcing, mine, open pit, open-cut, power plant, reinforce, reservoir, shore, slot, trench, suspension, thixotropic, trench, tunneling shield, underground leaching, underground structure, underpass, warehouse, waterproofing, water-supply plant

Task 2. Read the text silently, trying to grasp all the details of the contents. After that read the text aloud and translate it from English into Russian.

Underground structures are the structures built beneath the earth's surface. Their design, construction methods, structural elements, shoring, waterproofing, and air conditioning are determined by the purposes of the structures and the properties of the rocks.

There are many underground structures in developed countries as they are economic compared to surface structures in terms of money,

time and space. Underground structures are recommended for the regions with specific climate conditions such as abrupt deviations in air temperature, hurricanes, long and heavy rains etc.

Underground structures include tunnels, subway facilities, power plants, warehouses, cold storage chambers, pedestrian crossings, car parks, reservoirs for drinking water, facilities for oil and gas storage, containers for burying harmful industrial wastes, factories, medical facilities, mines, water-supply plants, military facilities and private homes.

Construction methods of underground structures depend on the purpose, the depth, the foundation pit and the geological conditions.

The open-cut method is used for constructing shallow underground structures.

Under the open-cut method used, the trenches or foundation pits are generally shored. Horizontal reinforcing with cross bracing is practiced for dry soil and the soil with natural moisture content, whilst interlocked reinforcing is used in unstable, saturated soil. Depending on drawdown open pit constructions are effective at the depth of 7-10 m.

The caisson method is used for building underground multi-storey car parks and underground structures of metallurgical plants.

Thixotropic suspensions are used in the trench method, which is based on the ability of to keep earthen walls from collapsing. This method is used by erecting the vertical walls of the underground structure in slot trenches before removing the earth inside the structure. This method is advisable under some hydrogeological conditions. It is effective for constructing such structures as underpasses.

The construction can be effected by blasthole drilling, by using cutter loaders, tunneling shields and underground leaching.

Task 3. Do the following statements agree with the information given in the text?

Write

TRUE

FALSE

if the statement agrees with the information

if the statement contradicts the information

Correct the false statements.

1. The design, construction methods, structural elements, shoring waterproofing, and air conditioning of an underground structure are determined only by a building owner's wish.
2. There are many underground structures in developing countries.
3. Underground structures include not only tunnels, subway facilities, power plants, factories, water-supply plants, but also private homes.
4. There is just one construction method used for all underground structures.
5. The open-cut method is used for constructing deep underground structures.
6. Open pit constructions are effective at the depth of 7-10 m.
7. The caisson method is used for building tunnels and coal mines.
8. Blasthole drilling is one of the ways used to effectuate the construction of underground structures.

Task 4. Answer the following questions. Practice the questions and the answers with your partner.

1. What are underground structures?
2. What do the design, the construction methods, the structural elements, the shoring, the waterproofing and the air conditioning of underground structures depend on?
3. For what regions are underground structures recommended?
4. What are the examples of underground structures?
5. What are construction methods of underground structure specified by?
6. For what underground structures is the open-cut method used?
7. What method is effectuated for building underground multistorey car parks?
8. What method is used for constructing underpasses?
9. What is the purpose of using blasthole drilling, cutter loaders tunneling shields and underground leaching in building underground structures?

Task 5. Translate into English.

1. Строительство подземных сооружений распространено в экономи-

чески развитых странах.

2. Методика строительства подземных сооружений зависит от их конструктивных особенностей, глубины залегания, геологических условий.

3. К подземным сооружениям относятся, например, тоннели, метрополитены, шахты, электростанции, паркинги для автомобилей, военные объекты, жилые дома.

4. Траншейный метод применяется для строительства подземных сооружений на небольшой глубине.

5. Поперечные распорки используются для укрепления траншей, а также котлована фундамента.

6. Кессонный метод применяется для строительства подземных паркингов.

7. При строительстве подземных сооружений применяются взрывные работы, используются врубо-погрузочные машины, практикуется подземное выщелачивание.

UNIT 7. GEODESY AND OTHER SCIENCES

Read the text and for each of the questions 1-10 choose the answer (A, B, C or D) which you think best fits according to the text.

Geodesy and Other Sciences

Clearly, there are many more uses for geodesy than simply mapping. Still other applications of geodesy are found in scientific fields that have a two-way relation with geodesy: while geodesy supplies one kind of information to them, they provide another kind of information for use in geodesy. Such fields are as follows:

Geophysics has a history of probably the closest affiliation with geodesy. So much so that in some countries geodesy is regarded as a branch of geophysics. Geophysics, along with many other fields, requires the positions and other geometrical information on the earth's temporal deformations. Geodetic techniques are used increasingly in the detection of tectonic movements.

Gravity is one of the most important sources of information used in geophysics. Gravity data is necessary for studying the irregulari-

ties in the underground mass density distribution. Since geodesists are also vitally interested in gravity data to study the geometry of the gravity field, both sciences claim a jurisdiction over gravity data collection (gravimetry). A somewhat artificial division would assign global gravity work to geodesy while regional and local gravity measurements would be a geophysical task. The temporal variations of gravity field offer a valuable hint about the physical causes of vertical crustal movements. As such, these data are often exploited in the context of contemporary geodynamics.

In return, geophysics offers an insight into the physical response of the earth to variety of force, into the possible density distribution within the earth, and into the effects of the internal structure of the earth on its motion. This information is needed when various mathematical models for geodetic purposes are being designed.

Space science, compared with geophysics, is a very young field. Right from the beginning, its relation to geodesy has also been a very close one. The main reason is that the knowledge of the geometry of the earth's external gravity field is essential for predicting the orbits of space vehicles. In addition, locations of satellite tracking stations must be known precisely enough to be of use; these are determined by geodetic means.

On the other hand, space science has developed some very powerful positioning systems that use the earth's artificial satellites, and these are now being used in geodesy to complement the existing terrestrial techniques. The analysis of the observed close satellite orbits now provides the best long wavelength data on the earth's gravity field, including the value of the flattening of the earth. Tracking of deep space probes gives the best estimates of the value of the mass of the earth.

Astronomy, one of the oldest sciences in existence, and geodesy developed hand in hand for a long time. Although the interdependence of geodesy and astronomy has somewhat diminished in the recent of past, positional visual astronomy still plays a certain role in geodesy. In addition, the future will probably see an increasing involvement of positional radio-astronomy. Another part of astronomy, celestial mechanics, is also needed in geodesy to study the satellite orbits. Geodesy shares

with astronomy the interest in lunar laser ranging; the ranges are used in astronomy to compute the lunar orbit and libration, while geodesists use them for position determination. Of common interest too is the monitoring of the rotation of the earth.

Oceanography is another science with which geodesy shares interests. Both geodesy and oceanography are involved in the location and movements of shorelines. Geodesy provides the oceanographers with relative heights of the on-shore water level measuring devices (tide gauges) and their relative vertical movements. Also, the geodetically determined positions of various marine objects, including ice and oceanographical vessels, are value to oceanographers.

Oceanographical information of interest to geodesists includes the dynamics of the sea surface and the deviations of the mean sea surface from an equipotential surface of the earth's gravity field. This information is needed for the establishment of a datum for heights.

Atmospheric science, along with all the aforementioned sciences, uses the geodetic positions and gravity pertaining to meteorological stations and probes. It shares with geodesy an interest in satellite orbit analysis: while geodesy interprets the orbital perturbations in terms of gravitational effects, atmospheric science looks at the effect of the distribution of air density. Geodesy needs realistic models for atmospheric refractivity and the appropriate meteorological data to evaluate atmospheric refraction. Meteorological data are also needed in the analysis of sea level temporal variations, and in special cases, that of the temporal variations of the earth's surface.

Geology requires both horizontal and vertical position for its maps. In return, it provides geodesists with knowledge of geomorphology and the local stability of different geological formations. The information on stability is a must for any geodesist in charge of selecting suitable sites not only for geodetic monuments, but also for observatories of various kinds.

Mathematics is the most important building block of geodesy. Algebra, Analysis, Geometry and Statistics are used.

Computer Science. Many of the problems faced by geodesy require a computer solution. Numerical analysis concepts are needed in geodesy.

affiliation – принадлежность
 earth's temporal deformations – временные деформации Земли
 geodetic data - геодезические данные
 exploration geophysics - разведочная геофизика
 mass density distribution - распределение массовой плотности
 crustal movements - смещения земной коры
 space vehicle - космический аппарат
 positioning system - система управления положением
 flattening of the earth - сжатие Земли, сжатие земного сфероида
 space probe- исследовательская беспилотная космическая станция, космический зонд
 lunar laser ranging- лазерная локация Луны
 position determination - определение положения
 shoreline - береговая линия, конфигурация берега
 relative height – превышение, относительная высота
 tide gauge – приливомер, прибор, регистрирующий изменение уровня воды
 deviation – отклонение
 orbital perturbation - возмущение орбиты
 atmospheric refractivity – лучепреломление
 atmospheric refraction - атмосферная рефракция

№	Questions	Alternatives
1	How is geodesy related with some other sciences?	<p>A. All sciences are independent from each other.</p> <p>B. They are symbiotically related with each other.</p> <p>C. Geology applies some information provided by other fields of science.</p> <p>D. There is one-way relation: they all depend on the geodetic data.</p>

2	What science has the closest relationship with geodesy?	<p>A. Astronomy</p> <p>B. Atmospheric Science</p> <p>C. Geology</p> <p>D. Geophysics</p>
3	What geodetic information is of most importance for geophysics and other sciences?	<p>A. The positions and other geometrical information on the earth's temporal deformations</p> <p>B. The effect of the earth internal structure on its motion.</p> <p>C. The concept of the earth's shape.</p> <p>D. The information on orbital perturbations.</p>
4	Why geodetic techniques are helpful for geophysics?	<p>A. They are very accurate and reliable.</p> <p>B. They explain the effects of the internal structure of the earth on its motion.</p> <p>C. These techniques give information on the possible density distribution within the earth.</p> <p>D. They help to detect tectonic movements.</p>
5	Why do geophysicists need gravity data?	<p>A. To calculate the earth's rotation rate.</p> <p>B. For studying the geometry of the gravity field</p> <p>C. For studying the irregularities in the underground mass density distribution.</p> <p>D. To design various mathematical models for geodetic purposes.</p>
6	Is gravimetry a branch of geodesy?	<p>A. Yes, it is.</p> <p>B. No, gravity data collection is a task for geophysics.</p> <p>C. Geodesy concerns only regional and local gravity measurements.</p> <p>D. Both geodesy and geophysics claim a jurisdiction over gravimetry.</p>
7	In what way does space science benefit	<p>A. Geodesy provides it with the knowledge of the geometry of the earth's external grav-</p>

	from geodesy?	<p>ity field for predicting the orbits of the space vehicles.</p> <p>B. Geodesy has developed some very powerful positioning systems that use the earth's artificial satellites.</p> <p>C. Geodesy is required to understand the motions of the earth and its satellites.</p> <p>D. Geodesy estimates of the value of the mass of the earth.</p>
8	What do geodesy and oceanography have in common?	<p>A. They both analyze the earth surface.</p> <p>B. Both are involved in the location and movements of shorelines.</p> <p>C. Their data are used in the on-shore water level measuring devices designing.</p> <p>D. The same on-shore water level measuring devices (tide gauges) are used by both sciences.</p>
9	What is the subject of atmospheric science?	<p>A. The geodetic positions and gravity.</p> <p>B. Creating realistic models for atmospheric refraction.</p> <p>C. The effect of the distribution of air density.</p> <p>D. The orbital perturbations in terms of gravitational effects.</p>
10	What geodetic data are required in geology?	<p>A. The knowledge of geomorphology.</p> <p>B. The theoretical basis of geodesy.</p> <p>C. The knowledge of the local stability of different geological formations.</p> <p>D. Horizontal and vertical position for mapping.</p>

UNIT 8. CITY CADASTER

Task 1. Read and translate the text.

Cadaster

A cadaster (also spelled cadastre) is a comprehensive register of metes and bounds real property of a country, and commonly includes details of the ownership, tenure, the precise location (some can include GPS coordinates), the dimensions, the cultivations if rural and the value of individual parcels of land.

The word came into English by way of French and Italian, variously attributed to the Late Latin *capitastrum*, a register of the poll tax, and Greek (*katastikhon*), a list or register from (*kata stikhon*), literally, “down the line”, in the sense of “line by line” along the directions and distances between the corners mentioned and marked by monuments in the metes and bounds. It gives rise to the adjective cadastral, used in public administration, primarily for ownership and taxation purposes, lots, blocks and city blocks. The terminology used for cadastral divisions may include counties, parishes, ridings, hundreds, sections, lots, blocks and city blocks.

Cadastral surveys are used to document land ownership, by the production of documents, diagrams, sketches, plans (plats in USA), charts, and maps. They were originally used to ensure reliable facts for land valuation and taxation. An example from early England is the Domesday Book. Napoleon established a comprehensive cadastral system for France which is regarded as the fore-runner of most modern versions. Cadastral survey information is often a base element in Geographic/Land Information systems used to assess and manage land and built infrastructure. Such systems are also employed on a variety of other tasks, for example, to track long-term changes over time for geological or ecological studies, where land tenure is a significant part of the scenario.

Task 2. Answer the questions to the text

1. What is cadaster?
2. What details does it commonly include?
3. From what languages did the word come into English?
4. To what ancient languages is it attributed?
5. For what purposes is the adjective *cadastral* used in public administration?
6. What are cadastral surveys used for?
7. What system is regarded the fore-runner of most modern versions?
8. What is a base element in Geographic/Land Information systems?
9. When are these systems employed?

Task 3. Translate the sentences into English.

- 1.Кадастр – это полный перечень юридических границ недвижимости.
- 2.Он включает подробное описание собственности, землевладения, точное местонахождение, размеры, стоимость участков земли, находящихся в личной собственности.
- 3.Терминология, которая используется для определения кадастровых единиц–это графства, гражданский округ (США), административная единица, мелкая административная единица, участок местности, участок земли (отведенный под что-либо), жилищный массив, квартал города.
- 4.Кадастровое межевание применяется для регистрации в документах права владения на землю.
- 5.Первоначально межевание использовалось для оценки земли и налогообложения.
- 6.В Великобритании в давние времена существовала Земельная Опись Англии (1086 г.)
- 7.Данные, полученные в результате кадастровой съемки, необходимы для оценки и управления землей и созданной инфраструктурой.
- 8.Информационные системы нужны для отслеживания произошедших изменений в течение длительного времени для применения в геологических или экологических исследованиях.

Task 4. Read and translate the text and answer the question: What information do maps express?

MAPS

Map is a drawn or printed representation of the earth or any other heavenly body. Most maps show part or all of the earth's surface. But maps also may show other planets, the moon, or the positions of stars in space. Most maps are flat, though some have raised surfaces. A globe is a map in the shape of a ball.

Maps express information through lines, colors, shapes, and other symbols. These symbols stand for such features as rivers, roads, and cities. The features represented on a map are greatly reduced in size. An inch (2.5 centimeters) on a map, for example, might represent a distance of 100 miles (160 kilometers).

We use maps to locate places, measure distances, plan trips, and find our way. Pilots of ships and airplanes use maps to navigate. Maps may also give us information about a place, such as its climate, population, and transportation routes. They can also show such patterns as where people live and how they use the land. We also use maps to make comparisons and draw conclusions. Geologists, for example, study maps of the earth's structure to help locate natural resources.

People probably made crude maps even before the development of written language some 5,500 years ago. Through the years, people have explored more of the world, adding new information to maps. Scientific discoveries have made maps more accurate. Today, most maps are based on photographs taken from the air. Cartography is the making and study of maps. Someone who makes or studies maps is a cartographer.

Task 5. Complete the sentences using the words from the box. The first letters of the words in the sentences will help you.

accurate, representation, cartography, structure, routes, natural resources, symbols, patterns, make comparisons, explored, draw conclusions

1. A drawn or printed *r* ... of the earth or heavenly body is a map.

2. Lines, colors, shapes, and other *s ...* stand for rivers, roads, and cities.
3. Maps show also transportation *r*
4. Where people live and how they use the land are the *p ...* which can be also learnt from maps.
5. When we study different maps we *m ... c ...* and *d... c... .*
6. Maps help geologists to locate *n ... r*
7. New information has been added to maps as through the years people have *e ...* more of the world.
8. Geographic discoveries contributed in making maps more *a*
9. The profession of people who study or make maps is *c....*

БИБЛИОГРАФИЧЕСКИЙ СПИСОК

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ИНОСТРАННЫЙ ЯЗЫК
АНГЛИЙСКИЙ ЯЗЫК ДЛЯ СТУДЕНТОВ
СТРОИТЕЛЬНЫХ СПЕЦИАЛЬНОСТЕЙ

*Методические указания к практическим занятиям
для студентов бакалавриата направления 21.03.02*

FOREIGN LANGUAGE
ENGLISH FOR CONSTRUCTION STUDENTS

Сост. *Ю.В. Борисова*

Печатается с оригинал-макета, подготовленного кафедрой
иностраннных языков

Ответственный за выпуск *Ю.В. Борисова*

Лицензия ИД № 06517 от 09.01.2002

Подписано к печати 14.05.2019. Формат 60×84/16.
Усл. печ. л. 2,2. Усл.кр.-отт. 2,2. Уч.-изд.л. 2,0. Тираж 50 экз. Заказ 436. С 168.

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