

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ЧЕРНІГІВСЬКИЙ НАЦІОНАЛЬНИЙ ТЕХНОЛОГІЧНИЙ
УНІВЕРСИТЕТ**

**АНГЛІЙСЬКА МОВА ЗА ПРОФЕСІЙНИМ СПРЯМУВАННЯМ
МЕТОДИЧНІ ВКАЗІВКИ**

**до практичних занять та самостійної роботи для студентів денної форми
навчання спеціальності 192 «Будівництво та цивільна інженерія»**

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Англійська мова за професійним спрямуванням . Методичні вказівки до практичних занять та самостійної роботи студентів денної форми навчання спеціальності 192 Будівництво та цивільна інженерія / Укл. : Яковенко Т.М., Кормільцина С.Ю. — Чернігів, ЧНТУ, 2018 — 48 с.

Укладачі: Яковенко Тетяна Миколаївна, викладач кафедри іноземних мов професійного спрямування.

Кормільцина Світлана Юріївна, викладач кафедри іноземних мов професійного спрямування.

Відповідальна за випуск:

Литвин С.В., завідувача кафедрою іноземних мов професійного спрямування, кандидат педагогічних наук, доцент.

Рецензент: Бараненкова Наталія Анатоліївна, кандидат філологічних наук, доцент кафедри іноземних мов професійного спрямування.

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ВСТУП

Методичні вказівки з англійської мови за професійним спрямуванням орієнтовані на студентів спеціальності 192 «Будівництво та цивільна інженерія» денної форми навчання, які володіють англійською мовою в межах нормативної граматики і соціально-побутової лексики на рівні середньої школи та призначаються як для опрацювання в аудиторії, так і для самостійної роботи студентів.

Методичні вказівки відповідають вимогам програми курсу «Іноземна мова для немовних ВНЗ» (2005 р.) та навчальному плану для студентів денної форми навчання спеціальності 192 «Будівництво та цивільна інженерія» механіко-технологічного факультету.

Головна мета вказівок — розвиток вмінь розуміння й аналізу текстів професійного спрямування, накопичення словникового запасу, формування у студентів лінгвістичної та фахової компетентності.

Методичні вказівки включають 3 розділи для самостійної роботи. Кожен розділ містить тексти фахового спрямування та завдання до них. Опрацювання студентами професійно спрямованого лексичного матеріалу значно полегшує розуміння тексту та виконання завдань. Вправи мають на меті розширення активного словника студентів, розвиток вмінь читання, усного та писемного мовлення. Запропоновані навчальні матеріали можна використовувати для групової та індивідуальної роботи студентів, вони також можуть стати у пригоді студентам, які мають певні проблеми з окремими положеннями англійської граматики і потребують матеріалу для практичних вправ.

Методичні вказівки допоможуть студентам сформуванню та вдосконалити вміння розуміння фахових текстів англійською мовою з мінімальним використанням словника. Комплексна структура методичних вказівок забезпечує ефективне формування та вдосконалення вмінь читання, перекладу, та використання професійно орієнтованої лексики в спілкуванні англійською мовою.

Unit 1. BUILDING CONSTRUCTION

SECTION 1

VOCABULARY AND WORD STUDY

1. Read and memorize the active vocabulary to the text “Building Engineering as a Discipline” and translate the given sentences.

1. **build (built)** v — будувати
building n — будівля
building design — проектуваннябудівель

They *build* new houses in that area. Types of *buildings* may be classified according to the role in the community. Modern *building* constitutes a vital element of national industry.

2. **construct** v — будувати, споруджувати
construction n — будівництво
building construction — домобудівництво

They are planning *to construct* a new supermarket near our house. The factors that condition the selection of materials for *construction* include availability, cost and physical properties. During *building construction*, several things went wrong.

3. **building engineering** — будівництво цивільних будівель
civil engineering — цивільнебудівництво
structuralengineering — проектування будівель

Building science and *building engineering* are fields of study concerned with the technical performance of buildings, building materials, and building systems. I am doing a *civil engineering* course at the university, which is very hard, but I am really enjoying it. *Structural engineering* has made rapid strides in the last century.

4. **air-conditioning** n — кондиціонування
air-conditioner n — кондиціонер

Buildings have *air-conditioning*. There are many similarities in the way *an air-conditioner works* to the way a refrigerator works.

5. **mean(meant)** v — означати; мати на увазі
means n — засоби, засіб; ресурси
by means of — за допомогою

The red light *means* “Stop”. They didn’t provide me with any *means* of transport. The tests were marked *by means of* a computer.

6. **diverse** *adj* — різноманітний, різний
diversity *n* — різноманітність

The growing building industry offers *diverse* job opportunities. He has a great *diversity* of interests.

7. **impact** — *n* вплив

The computer has had (made) a great *impact* on modern life.

8. **measure** — *n* вміра; вимірювати
measurement *n* — розмір, вимір

We *take* certain *measures* to reduce the consumption of the material. She *measured* the table. This table *measures* two metres by one metre. We can find the size of something by means of *measurement*.

9. **vary** *v* — міняти, змінювати
various *adj* — різний, різноманітний
variety *n* — різноманітність

Steel *varies* considerably in its microstructure. The demand for *various* building materials is enormous. A wide *variety* of mass-produced elements are now available.

10. **maintain** *v* — обслуговувати, зберігати в гарному стані
maintenance *n* — догляд, збереження, ремонт, підтримка

Some floor materials are easy *to maintain*. These operations involve the construction, *maintenance* of structures, grounds, and so on.

11. **structure** *n* — конструкція, будівля
building structure — будівельна конструкція, будівля

Wood *structures* were very common in earlier times. The more insulation we provide, the more *the building structure* costs.

12. **foundation** *n* — фундамент

First they laid *the foundation*, and then they built the walls.

13. **computer-aided design (CAD)** — автоматизоване проектування

Today, the use of Computer-Aided Design techniques has revolutionised design and construction processes within the industry.

14. facility *n* — пристрій, оснащення; будівля; (*pi.*) умова, можливість, засіб

A new *facility* had been built just outside the city to process all the sewage. The new factory has enabled to bring research and development activities under the same roof as all production *facilities*.

15. perform *v* — виконувати

Performance *n* — ефективність, ккд; експлуатаційні характеристики; робота

They *perform* a considerable amount of building work at the factory. This enables us to ensure the good *performance* of the beams.

16. utility *n* — (*pi.*) інженерні мережі; комунальні послуги; комунальні підприємства

conservation utility — управління з охорони природи та раціонального природокористування

The introduction of urban *utilities* improved life in the city.

17. survey *n* — топографічна зйомка (служба); виконати топографічну зйомку

surveying *n* — зйомка, промір, картування

surveyor *n* — геодезист, маркшейдер

Surveys are made for many purposes, such as the determination of areas, and the plotting of maps. They started *to survey* the piece of land that the new motorway will pass through. *Surveying* is employed to measure and locate lines and angles on the surface of the earth. Many new instruments are employed to facilitate the *surveyor's* work.

18. apply *v* — використовувати, застосовувати

applied science — прикладна наука

application *n* — використання, застосування

This building method is successfully *applied* in different cities and towns in this country. *Application* of plastics in the building field widens from year to year.

19. operate *v* — працювати, приводити в дію

operation *n* — робота, операція, експлуатація

The instrument was set *to operate* at a certain pressure. All *operations* on the site are minimized.

20. renovate *v* — відновлювати,

renovation*n* — реконструкція, відновлення

The house *was renovated* by the current owners to provide modern living.
The stadium is re-opening after a three-year *renovation*.

2. Read and translate the following international words. Look up their transcriptions in the dictionary if necessary. Mind the part of speech.

Activity *n*, function *n*, effect *n*, global *adj*, manifestation *n*, natural *adj*, produce *v*, integrate *v*, technology *n*, design *n v*, discipline *n*, interdisciplinary *adj*, manager *n*, management *n*, operation *n*, traditional *adj*, ventilation *n*, mechanical *adj*, acoustics *n*, project *n*, methodology *n*, cycle *n*, efficiency *n*, career *n*, budget *n v*, logistics *n*, tender *n*, resource *n*.

3. Match the pairs of synonyms from A and B and translate them.

A

1. repair
2. operation
3. construction
4. appliance
5. restoration
6. use
7. base
8. way
9. influence
10. various

B

- a. impact
- b. means
- c. application
- d. foundation
- e. diverse
- f. maintenance
- g. performance
- h. facility
- i. building
- j. renovation

4. Match the verb on the left with a suitable item on the right. Use each item once only.

A

1. do
2. measure
3. install
4. carry out
5. build
6. train
7. apply
8. take
9. provide
10. vary

B

- a. an air-conditioner
- b. a house
- c. utility services
- d. management principles
- e. the windows
- f. measurements
- g. among CAD systems
- h. a civil engineering course
- i. as a surveyor
- j. building design

5. Make the following sentences complete by translating the words and phrases in brackets.

1. The inventive monitoring method consists in determining loads applied to (будівельніконструкції). 2. The new owner wants to (реконструювати) the building he bought. 3. The building engineering programme is presented (за допомогою) lectures, tutorials, seminars and case studies. 4. The company seeks a building engineer to (використовувати) and (обслуговувати) all building equipment and systems. 5. A degree course in (проектуваннябудівель та споруд) takes four years in the UK. 6. The city engineer (виконавтопографічнузйомку) the property to amend the map. 7. For people interested-in the many well-paying careers in (домобудівництві), this association offers numerous educational and career resources. 8. This course provides students with an understanding of the characteristics of a (різноманітність) of materials used in building. 9. The company hired a contractor to (виконати) construction work on a new building. 10. What does the term *utility* (означати)?

6. Read and translate the following word combinations which come from the texts of the Unit. Mind the use of nouns as attributes in preposition. Look up your dictionary if necessary.

Example

- a. arch building — арчнабудівля
- b. market building — будівляринку
- c. exhibition building — будівлядлявиставки

Power distribution, indoor air quality, project management, construction management, design engineer, cost engineer, process engineer, HVAC (heating, ventilation and air-conditioning) engineer, facility manager, operation manager, computer programming, the life cycle of a building, energy efficiency, control systems, earthquake resistance, wind effects, career possibilities, soil mechanics, building service systems, craft traditions, material properties and performance, safety standards, site safety, construction delays, construction technologies, tender documents, quality control, building construction project, local building authority regulations, highway construction, on a per square metre (foot) basis.

7. Study the following patterns showing the ways some nouns are formed from verbs. Complete the charts. Some of the missing words are from the texts of the Unit. Read and translate them into Ukrainian. Use your dictionary to help you with the pronunciation.

Pattern 1

Verb + **-er/-or** -> Noun

The **-er/-or** suffixes are used for a person who does an activity and for things which do a particular job.

Example: build — будувати—> builder — будівельник

<i>Verb</i>	<i>Noun</i>
manage	_____
compute	_____
direct	_____
design	_____
survey	_____
contract	_____
elevate	_____

Pattern 2

Verb + **-ment** ->Noun

The **-ment** suffix is used for an act or result of something.

Example: achieve — досягати—> achievement — досягнення

<i>Verb</i>	<i>Noun</i>
manage	_____
environ	_____
develop	_____
arrange	_____
establish	_____
improve	_____
elevate	_____

Pattern 3

Verb + **-ion/-ation/-ition/-sion/-tion** -> Noun

The **-ion/-ation/-ition/-sion/-tion** suffixes are used for an act, state, or result of something.

Example, construct — будувати—> construction — будівництво

<i>Verb</i>	<i>Noun</i>
educate	_____
manifest	_____
renovate	_____
found	_____
integrate	_____
ventilate	_____
distribute	_____
decide	_____
execute	_____
operate	_____

SECTION 2

GRAMMAR

8. Arrange these words in the right order. Use a capital letter to begin each sentence. Mark each rewritten sentence SVOMPT to show Subject, Verb, Object, Manner (How?), Place (Where?), Time (When?).

Example

worked, till 5 o'clock, Peter, at the plant. — (S) Peter (V) worked (P) at the plant (T) till 5 o'clock.

1. well, I, English, speak. 2. begins, in September, my term. 3. use, for many, scientists, computers, different purposes. 4. an old, mathematics, science, is. 5. from the university, will, an engineer, he, be, after graduation. 6. the knowledge of, today, is, very, English, important. 7. begin, at 9 o'clock, in the morning, the lectures. 8. tomorrow, will, in Rome, be, she. 8. every, year, leave, schools, millions of, secondary, children. 9. the term, attend, during, and, lectures, seminars, students. 10. a cottage, in the suburbs, constructed, of Moscow, they. 11. statistical, in their work, use, the researchers, methods.

9. Read and translate the following complex sentences with different types of subordinate clauses. Use your dictionary if necessary.

1. Technical occupations require more training as a greater technical knowledge is required. 2. Construction colleges offer a specialized learning environment for students who want to learn how to understand basic concepts about building processes. 3. The industry experts have predicted that there will be more than 45,000 new construction jobs in Scotland over the next decade. 4. In the fields of architecture and civil engineering, construction is a process that consists of the building or assembling of infrastructure. 5. That this type of cables must be placed correctly is essential. 6. Once the design is completed by the design team, a number of construction companies may be asked to make a bid for the work. 7. A construction project is a complex net of contracts and other legal obligations, each of which must be carefully considered. 8. Construction managers may travel considerably when they are responsible for activities at many sites. 9. Although the construction work is not dangerous, injuries can occur. 10. What is important is the correct sequence of building operations.

10. Read and translate the following complex sentences with relative clauses in which the relative conjunctions are left out.

Example

I haven't seen the fax *we received* this morning. — Янебачивфакс, котрий ми отримали сьогодні вранці.

1. The structural engineer must design structures to be safe for their users and to successfully fulfil the function they are designed for. 2. There are lots of different types of engineering. The one thing they have in common is that they use Maths and Science to improve industry and manufacturing. 3. The report he made after the delegation had visited our plant shows that he has finally realized the importance of the work we are doing here. 4. The noise I heard was caused by the arrival of the lorries with new products. 5. The way the weight of the components of concrete is determined is specified by the requirements of the project and the various local building codes and regulations. 6. The type of houses the constructors were building was part of the great construction boom.

11. In some of these sentences you don't need *who*, *which* or *that*. If you don't need these words, put them in brackets like this: (*who*), (*which*), (*that*).

Example

The job *that* he got wasn't very interesting, (*that can* be left out)

The people *who* work in the office are highly skilled experts, (*who* is necessary here)

1. The technique *that* they used in structures was worked out by the design team. 2. A number of advantages *that* ceramic tiles offer to builders make them an attractive proposition. 3. Prospects will be best for people *who* have a bachelor or higher degree in construction science. 4. The students *who* we met at the construction site were having practical training. 5. Different plastics *which* architects use for decorative purposes include glass fibre.

12. Read and translate the following emphatic sentences *it is that/which/who* into Ukrainian.

Example

It is the data *that* (*which*) are reliable. — Саме ці дані є надійними.

1. It is this method that speeds up construction work. 2. It is the college which offers a course in building construction. 3. It was Lomonosov who first discovered the law of conservation of energy. 4. It is only by performing a lot of experiments that progress can be made. 5. It is the construction management course that covers several areas of construction science and basic business practices.

SECTION 3

READING AND SPEAKING

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

1. Do you know how building construction began?
2. Is there any difference between civil engineering and building engineering?
3. Is building engineering a big subject?
4. Why is building engineering very important in modern life?
5. What building engineering courses are usually taught at higher educational institutions?
6. What degrees do building engineering academic programmes provide?

14. Read Text 1A to find out if your answers are right or wrong. The following phrases 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 1A

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



Institution of Civil
Engineering
headquarters in
London

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 sub-systems 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, HVAC 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 subdisciplines.

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

15. Find in Text 1A the paragraph about the areas in which building engineering graduates may work and translate it into Ukrainian.

16. Read aloud paragraph 3.

17. Explain the following references.

a) 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.

What does the pronoun *its* refer to?

b) Building engineering is an interdisciplinary engineering discipline 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.

What does the pronoun *their* refer to?

c) 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 sub-systems and *their* individual components.

What does the pronoun *their* refer to?

d) The Master and Engineer's degree may consist of either research, coursework or a mixture of the *two*.

What are those *two*?

e) The Doctor of Philosophy consists of a significant research component and *it* is often viewed as the entry point to academia.

What does the pronoun *it* refer to?

18. Underline or mark the main ideas of Text 1A and retell it in English.

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

• **TEXT 1B**

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.



Building construction
for several apartment
blocks

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.

20. Identify the topic of each paragraph of Text IB.

21. Complete the sentences choosing the best variant corresponding to the contents of Text IB.

- 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.

22. Read Text 1C “Construction Projects” and answer the following questions. Discuss your answers with your groupmates.

- a) What does a construction process involve?
- b) What is required for the successful execution of a construction project?
- c) How many types of construction are there?
- d) Who ensures positive end results of construction projects?
- a) Why can the cost of construction vary?
- b) What is the negative outcome of residential construction?
- c) What are the new methods of construction characterized by?
- d) Why is industrial construction a very important part of the construction industry?

• TEXT 1B

Construction Projects

In the fields of architecture and civil engineering, construction is a process that consists of the building or assembling of infrastructure. Far from being a single activity, large scale construction is a feat of multitasking. Normally the job is managed by the project manager and supervised by the construction manager, design engineer, construction engineer or project architect.

For the successful execution of a project, effective planning is essential. Those involved with the design and execution of the infrastructure in question must consider the environmental impact of the job, the successful scheduling, budgeting, site safety, availability of materials, logistics, inconvenience to the public caused by construction delays, preparing tender documents, etc. In general, there are two types of construction: building construction and industrial construction. Each type of construction project requires a unique team to plan, design, construction, and maintain the project.

Building construction is the process of adding structure to real property. The vast majority of building construction projects are small renovations, such as addition of a room, or renovation of a bathroom. The owner of the property often acts as labourer, paymaster, and design team for the entire project. However, all building construction projects include some elements in common — design, financial, and legal considerations. Many projects of varying sizes reach undesirable end results, such as structural collapse, cost overruns, and/or litigation reason. Those with experience in the field make detailed plans and maintain careful oversight during the project to ensure a positive outcome.

Residential construction technologies and resources must conform to local building authority regulations and codes of practice. Materials readily available in the area generally dictate the construction materials used (e.g. brick versus stone or timber). The cost of construction on a per square metre basis for houses can vary dramatically based on site conditions, local regulations, economies of scale (custom designed homes are always more expensive to build) and the availability of skilled workers. Residential and all other types of construction can generate a lot of waste, careful planning is needed again here.

The popular method of residential construction in the United States is wood framed construction. As efficiency codes have come into effect in recent years, new construction technologies and methods have emerged. University Construction Management departments are on the cutting edge of the newest methods of construction intended to improve efficiency, performance and reduce construction waste.



Industrial construction, though a relatively small part of the entire construction industry, is a very important component. Owners of these projects are usually large, for-profit, industrial corporations. These corporations can be found in such industries as medicine, petroleum, chemical, manufacturing, etc. Processes in these industries require highly specialized expertise in planning, design, and construction. As in building and heavy/highway construction, this type of construction requires a team of individuals to ensure a successful project.

Unit 2. GREAT CIVIL ENGINEERS

SECTION 1

VOCABULARY AND WORD STUDY

1. Read and memorize the active vocabulary to the text “Vladimir G. Shukhov” and translate the given sentences.

1. **tower** *n* — вежа; хмарочос, висотна будівля
broadcasting tower — радіовежа

The Eiffel *Tower* is an 1889 iron tower located in Paris that has become one of the most recognizable structures in the world. There are over 4,000 *tower* blocks, homes for about 800,000 people.

2. **flank** *v* — розташовані по сторонам, приєднуватисі

The central street *is flanked* by two slender octagonal towers.

3. **curven** — крива; закруглення

The weight is distributed along *the curve* of the arch.

4. **roof** *n* — криша, кривля, кровельні покриття
roofer *n* — кровельщик

The concrete *roof* of the new four-storey building was put on. *Roofers* work outdoors and at heights, and use ladders and scaffolding.

5. **stress** *n* — (механічна) напруга

Building designers have to know about *stress*.

6. **deform** *v* — деформувати, коробити
deformation *n* — деформація

Heat *deforms* plastics. The amount and character of *the deformations* are connected with the chemical composition and physical structure of engineering materials.

7. **beam** *n* — балка
straight beam — прямабалка

Beams are very important members in many structures.

8. **shell** *n* — оболонка, каркас, обшивка
grid (lattice) shell — сітчата (решітчата) оболонка

After the fire, all that was left was the burned-out *shell* of the building. As *grid shells* became more popular new solutions were developed in terms of choice of material. The Shukhov Tower experiences minimum wind load due to its *lattice shell* structure.

9. **metal structure** — металева конструкція

The metal structures of the building were assembled on the site.

10. **cause** *v* — бути причиною, викликати

Unsatisfactory organization of work *causes* delays.

11. **tensile** *adj* — працюючий на розтяг

An earthquake may move the arch and cause *tensile* forces in it.

12. **storey** *n* — поверх

All buildings of the factory were two-*storey* buildings.

13. **vault** *nv* — звід
vaulting *n* — звід спорудження
glass vaulting — скляний звід
high-pitch vaulting — високий звід

The vault and the dome were evolved in the East. The center piece of this laige complex is a five-storey brick house with internally cast-iron columns and brick *vaulting*.

14. **concrete** *nadj* — бетон; бетонний

Concrete is capable of withstanding high temperatures.

15. **truss** *n* — ферма
steel truss — сталева ферма

It is necessary to place *trusses* to carry the ends of the beams.

16. **high rising (rise) building** — висотна будівля

A *high-rise building* is defined as a building 35 meters or greater in height, which is divided into occupiable levels.

17. **innovation** *n* — нововведення
bring innovations — вводити нововведення

innovative *adj* — новаторський, передовий

The new system in the university canteen was a welcome *innovation*. Some *innovations were brought* to construction. A number of *innovative* facade systems are available including composite panels.

18. develop *v* — розробляти, розвивати
development *n* — розвиток, розробка; забудова

A laminate *has been developed* which is suitable for both inside and outside use. It has *developed* into a very large city. He had some important *developments* in building construction. The new *development* modifies an existing environment.

19. support *v* — опора; підтримувати, підпирати

A simple beam is one that lies on two *supports* at the ends. Beams are used *to support* floors in buildings.

20. locate *v* — розташовувати, призначити місце(*syn.*)
place *v* — поміщати, розміщувати

The entrance to the house *is located* on the south side. The frames *are placed* between end walls and spaced at 3 metre centres.

2. Read and translate the following international words. Look up their transcriptions in the dictionary if necessary. Mind the part of speech.

Architect *n*, analysis *n*, industrial *adj*, innovation *n*, gallery *n*, hyperboloid *n*, hyperbolic *adj*, calculation *n*, membrane *n*, optimal *adj*, theoretical *adj*, reservoir *n*, barge *n*, protection *n*, transmission *n*, cylindrical *adj*, elite *adj*, arch *n*, arcade *n*, terminal *n*, originally *adv*, gigantic *adj*, parabola *n*, grandiose *adj*, rotation *n*.

- | | |
|------------------------|-------------------------|
| A | B |
| 1. improve | a. high rising building |
| 2. rigid | b. innovative |
| 3. Low rising building | c. high-pitch vaulting |
| 4. straight | d. deform |
| 5. solid | e. development |
| 6. regressive | f. tensile |
| 7. stoppage | g. curve |
| 8. low-pitch vaulting | h. lattice |

3. Match the pairs of antonyms from A and B and translate them.

4. Match the noun(s) on the left with a suitable item on the right. Use each item once only.

5. Replace the underlined words with the words below.

a) flank b) roof c) support d) shell e) storey
f) vaulting g) truss h) cause i) place j) innovation

1. A roofer	a. changes an object.
2. A broadcasting tower	b. is semicircular in shape.
3. Deformation	c. carry loads.
4. A steel truss	d. brought innovations.
5. A vault	e. were erected.
6. A grid shell	f. sends radio and TV signals.
7. The construction company	g. developed roof systems.
8. Steel beams	h. builds and repairs roofs.
9. V.G. Shukhov	i. was pioneered by Shukhov.
10. Metal structures	j. comprises triangular units.

1. Only the framework of the building stood after the fire. 2. The wooden beams form a rigid structure to support a roof. 3. The survey examined the impact of current modernization within the construction industry. 4. They installed a protective covering that forms the top of the building. 5. They managed to solve the technical aspects of doming that building. 6. Large beams bear the damaged wall. 7. This approach may lead to the improvement in construction planning and management. 8. Hotels and rooming houses still line the streets in this town. 9. They decided to locate, a new construction site just 30 miles from the city centre. 10. Many firms are likely to consider renovating or constructing multi-floor buildings.

6. Read and translate the following groups of sentences paying attention to the words in italics which can function as a noun and a verb, or a verb and an adjective, or a noun and an adjective, with the same form. They can have similar or different meanings. Look up your dictionary if necessary.

- Did the speaker *stress* the need for better education?
 - Stress* can lead to the building collapsing.
 - They place too much *stress* on money and position.
- He mentioned the *cause* of structural failure.
 - These facts *cause* an increase in the span of the beam.
 - Don't stay away without good *cause*.
- They should *concrete* the garden path.
 - This caused the expansion of the *concrete* floor.
 - The walk was paved with *concrete*.

4.
 - a. *Beams* of light penetrated the darkness.
 - b. The transmitter *beams* radio waves all over the country.
 - c. A frame consists of *beams* and columns with foundation.
5.
 - a. Various materials can be used to construct a water *tower*.
 - b. The high mountains *tower* over the little town.
 - c. Piles were driven for a platform to support a *tower* crane.

7. Study the following patterns showing the ways some nouns are formed from verbs and adjectives, and some adverbs are formed from adjectives. Complete the charts. Some of the missing words are from the texts of the Unit. Read and translate them into Ukrainian. Use your dictionary to help you with the pronunciation.

Pattern 4

Verb/Adjective + **-ance/-ence** —> Noun

The **-ance/-ence** suffixes are used for an action, or quality of something.

Example: accept -приймати-> acceptance —прийняття
 depend — залежати—» dependence — залежність

<i>Verb/Adjective</i>	<i>Noun</i>
resist	-----
appear	-----
elegant	-----
abundant	-----
important	-----
exist	-----
occur	-----
absent	-----
convenient	-----
different	-----

Pattern 5

Verb + **-ure** -> Noun

The **-ure** suffix is used for an act or condition of something.

Example: fail — руйнуватися -> failure — руйнування

<i>Verb</i>	<i>Noun -</i>
depart	-----
disclose	-----
please	-----
expose	-----
mix	-----

close -----

Pattern 6

Adjective + -ly -> Adverb

Example: exact — точний-> exactly — точно

<i>Adjective</i>	<i>Adverb</i>
independent	-----
correct	-----
equal	-----
cheap-----	-----
obvious	-----
proper	-----
frequent	-----
rapid	-----

SECTION 2

GRAMMAR

8. A. Complete the tense chart. Use the verb write for the Active Voice.

ACTIVE	Simple	Continuous
Present	<i>he writes</i>	<i>we are writing</i>
Past		
Future		
Present Perfect		
Past Perfect		
Future Perfect		

B. Compare the following sentences and translate them.

1. They *clean* the office every day. They *are cleaning* the office now. They *have cleaned* the office for two hours. They *have been cleaning* the office for two hours. 2. They *cleaned* the office yesterday. They *have just cleaned* the office. They *were cleaning* the office when the boss came. They *had cleaned* the office when the boss came. They *had been cleaning* the office for two hours when the boss came. 3. I think they *will clean* the office tomorrow. They *will be cleaning* the office when the boss comes. They *will have cleaned* the office by the time the boss comes. They *will have been cleaning* the office for two hours when the boss comes.

9. Write the following sentences in the negative form. Then change them to general, alternative, special (beginning with the question-words given in brackets) and tag questions.

1. They constructed two houses last year. (When? What? How many? Who?)
2. My friends are building their own house now. (What? When? Who? Whose?)
3. He has known him for a long time. (Who? How Long?)
4. The office usually closes at 7 o'clock in the evening. (When? What time? What?)
5. The chief engineer will be visiting the construction site in the suburbs of the town from 2 o'clock till 4 o'clock tomorrow. (Where? When? What time? Who?)
6. They had built a new hospital before I came to that town. (What? When? Who?)
7. The designer was using a computer in the office at 3 o'clock yesterday. (Where? What? When? What time? Who?)
8. My fellow students will have their field training during the vacation. (When? What? Who? Whose?)
9. They will have finished construction by the end of the year. (What? When? Who?)
10. We have been developing this product for two years. (What? How long? Who?)

10. Fill the gaps with the correct form of the verb. Translate the sentences into Ukrainian.

1. The number of people working in building construction (go down).
2. The manufacture of these structures(grow) over several decades.
3. I am sure they (offer) him a new job next week.
4. By the mid-1990s, the country's production of building materials (double).
5. Technical requirements in building construction (grow) day to day now.
6. They (take up) repairs for various roads last year.
7. The builder says he (finish) the roof by next Saturday.
8. They (make) products at the lowest possible cost at that time.
9. Many construction projects usually (suffer) from financial problems.
10. I (work) at the plant for three years when my brother arrived.
11. The company (make) new types of products at this time next year.
12. When Mr. Brown retires next year, he (work) for this company for 25 years.

11. Read and translate the following sentences into Ukrainian paying attention to the predicates used in the Simple, Continuous, Perfect and Perfect Continuous forms.

1. About two thousand photos and negatives made by Vladimir G. Shukhov have survived until this day.
2. They have been working out a new production plan for two weeks.
3. Cities will grow, but the growth must be controlled.
4. Vladimir G. Shukhov brought a lot of innovations to the oil industry and the construction of numerous bridges and buildings.
5. They were conducting an interesting experiment on the construction site from 9 o'clock till 12 o'clock yesterday.
6. At present this department is conducting tests on new materials.
7. After the exhibition had closed, the tower of rare beauty was bought by the well-known Maecenas and placed in his estate.
8. Steel trusses are clearly visible, and they demonstrate the elegance of the grandiose building.
9. Vladimir G. Shukhov's innovative and exquisite constructions still grace many towns across Russia.
10. The investigation has shown that, if properly used, lower cranes will effect considerable savings in building costs by avoiding the necessity for double handling of materials and by enabling large pieces of a structure to be prefabricated on the ground and then hoisted into position.
11. He has known the chief engineer for three years.

12. Read and translate the following sentences with *used to* (панише, перш, колись, вминулому).

Example

He used to be an engineer. — Колись він був інженером.

1. Building operations used to stop in very bad winter conditions. 2. I used to have a car, but I sold it. 3. The factory used to be in the city centre. 4. He used to work as a construction worker before he started his own business. 5. Did he use to live in that town when he was a child? 6. I didn't use to drive to work.

SECTION 3 **READING AND SPEAKING**

13. What do you know about Vladimir G. Shukhov? Read the statements given below and say if they are right or wrong. If the statements are not right, make the necessary corrections.

a) V.G. Shukhov developed hyperboloid structures.

b) Based on the calculations of the optimal diameter and wall thickness of pipelines, Shukhov designed the first Russian oil tanker.

c) V.G. Shukhov contributed to the development of new architectural forms in Russia. The first hyperboloid structure in the world was the steel lattice 37-meter tower built by V.G. Shukhov for the 1896 All-Russia industrial and art exhibition in Nizhniy Novgorod.

d) Petrovsky Passage, an elite department store, and the Kiyevsky Rail Terminal in Moscow were designed by V.G. Shukhov.

e) The Shukhov radio tower, also known as the Shabolovka tower, is not a hyperboloid structure.

14. Read Text 2A to find out if you are right or wrong. Use the introductory phrases given in Unit

• TEXT 2A

Vladimir G. Shukhov



V.G. Shukhov

Vladimir Grigoryevich Shukhov (1853— 1939) was a great Russian engineer, scientist and architect renowned for his pioneering works on new methods of analysis for structural engineering that led to breakthroughs in industrial design. Besides the innovations he brought to the oil industry and the construction of numerous bridges and buildings, Shukhov was the inventor of a new family of doubly- curved structural forms. These forms based on non-Euclidean hyperbolic geometry are known today as hyperboloids of revolution. Shukhov developed not only many varieties of light-weight hyperboloid towers and roof systems, but also the mathematics for their analysis.

V.G Shukhov is referred as the Russian Edison He was one of the first to develop practical calculations of stresses and deformations of beams, shells and membranes on elastic foundation. These theoretical results allowed him to design the first Russian oil tanker, new types of oil tanker barges, and oil reservoirs The same principle of the shell on an elastic foundation allowed calculating the optimal diameter, wall thickness and fluid speed for the fluid pipelines.

V G. Shukhov also left a lasting legacy to the Constructivist architecture of early Soviet Russia. As a leading specialist of metallic structures (hyperboloid structures, thin-shell structures, tensile structures), he may be compared with G. Eiffel. Shukhov's innovative and exquisite constructions still grace many towns across Russia.

For the 1896 All-Russia industrial and art exhibition in Nizhniy Novgorod V.G. Shukhov built the steel lattice 37-meter tower which became the first hyperboloid structure in the world. The astonishing hyperboloid steel grid shell caused delight of the European specialists. After the exhibition had closed, the tower of rare beauty was bought by the well-known Maecenas of that time Yu.S. Nechayev-Maltsov and placed in his estate Polibino, Lipetsk oblast, where it has preserved until now under the state protection. In the subsequent years, Shukhov developed numerous structures of various hyperboloid steel grid shells and used them in hundreds of water towers, sea lighthouses and supports for power transmission lines. The hyperboloid structures appeared abroad only 10 years after Shukhov's invention.

Petrovsky Passage is an elite department store opened in Petrovka Street in downtown Moscow in 1906. Vladimir Shukhov designed a covered arcade with two wide three-storey galleries covered with high-pitched semi-cylindrical glass vaulting. The second storeys of opposite galleries are connected by exquisitely designed ferroconcrete catwalks. In the 1990s, the shop was revamped as the centre of one of the most expensive shopping areas in Europe.

The Kiyevsky Rail Terminal is one of the nine rail terminals of Moscow. The station was built between 1914 and 1918 in the Byzantine Revival style. Originally named the Bryansk Rail Terminal, it was designed by Ivan Rerberg and Vladimir Shukhov; it is considered an important landmark of architecture and engineering of the time. The station building is flanked by a gigantic landing platform which is distinguished by its simplicity and constructive boldness. The platforms are covered by massive glassed arch structures in the form of a parabola. Open-work steel trusses are clearly visible, and they demonstrate the elegance of the grandiose building.

The Shukhov radio tower, also known as the Shabolovka tower, is a broadcasting tower in Moscow designed by V. Shukhov. The 160-metre-high free-standing steel structure was built in the period of 1919 — 1922. It is a hyperboloid structure. Due to its lattice structure the steel shell of the Shukhov Tower experiences minimum wind load (the main hazard for high-rising buildings). The tower sections are single-cavity hyperboloids of rotation made of straight beams,

the ends of which rest against circular foundations. The tower is located a few kilometers south of the Moscow Kremlin.

Shukhov is also reputed for his original designs of more than 180 bridges across the Volga, Yenisey, Dnieper, and other rivers.

15 Find in Text 2A the paragraph saying about the structure of the Shukhov radio tower and translate it into Ukrainian.

16. Read aloud paragraphs 2 and 3 of Text 2A.

17. Explain the following references.

a) *These* forms based on non-Euclidean hyperbolic geometry are known today as hyperboloids of revolution.

What does the demonstrative adjective *these* refer to?

b) V. Shukhov developed the mathematics for *their* analysis.

What does the pronoun *their* refer to?

c) V.G. Shukhov is referred to as the Russian *Edison*.

Who is *Edison* referred to?

d) he may be compared with *G. Eiffel*.

Who is *G. Eiffel* referred to?

e) it is considered an important landmark of architecture and engineering of the time.

What does the pronoun *it* refer to?

f) The station building is flanked by a gigantic landing platform which is distinguished by *its* simplicity and constructive boldness.

What does the pronoun *its* refer to?

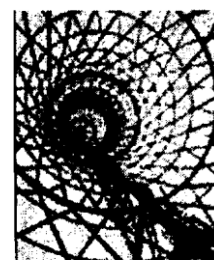
18. Find in Text 2A some key words and expressions to speak about V.G. Shukhov's innovations in building engineering and architecture. Retell the Text in English.

19. Skim Text 2B "V.G. Shukhov's Biography" and try to understand what it is about and what information is new to you 19.

• **TEXT 2B**

V.G. SHUKHOV'S BIOGRAPHY

Vladimir Shukhov was born in the town of Graivoron, Belgorod uyezd, Kursk guberniya (in present-day Belgorod oblast) into a petty noble family. His father Grigory Shukhov was a minor government official, promoted for his efforts in the Crimean War. For a while Grigory served as Mayor of Graivoron and later as an administrator in Warsaw.



Shukhov Tower
in Moscow

In 1864 Vladimir entered St. Petersburg gymnasium from which he graduated with distinction in 1871. During his high school years he showed mathematical talents, once demonstrating to his classmates and teacher an original proof of the Pythagorean theorem. The teacher praised his skills but he failed the grade for violating the guidelines of the textbook.

After graduating from the gymnasium, Shukhov entered the Imperial Moscow Technical School in which his teachers included Pafnuty Chebyshev, Aleksey Letnikov, and Nikolay Zhukovsky. In 1876 Shukhov graduated from the school with distinction and a Gold Medal. Chebyshev proposed him a job as a lecturer in mathematics at the Imperial Moscow Technical School, but Shukhov decided to seek a job in the industry instead.

Thereupon Shukhov went to Philadelphia to work on the Russian pavilion at the World's Fair and to study the inner workings of the American industry. During his stay in the US Shukhov came to know a Russian-American entrepreneur, Alexander Bari who also worked on the organization of the Fair.

In 1877 Shukhov returned to Russia and joined the drafting office of the Warsaw-Vienna railroad. Within several months, Shukhov's frustration with standard and routine engineering made him abandon the office and join a military-medical academy. On his coming to Russia in 1877, Bari persuaded Shukhov to give up his medical education and to assume the office of Chief Engineer in a new company specializing in innovative engineering. Shukhov worked with Bari for this company until the October Revolution. Their works revolutionized many areas of civil engineering, ship engineering, and oil industry. The thermal cracking method, the Shukhov cracking process, was patented by Vladimir Shukhov in 1891.

Shukhov always found time for a passionate hobby — photography. The photographic works of Shukhov opened new trends ahead of their flourishing of fine art photography. He made photos in various genres: city landscape, portrait, constructivism. About two thousand photos and negatives made by Shukhov have survived until this day.

After the October Revolution Shukhov decided to stay in the Soviet Union despite having received alluring job offers from around the world. Many signal Soviet engineering projects of the 1920s were associated with his name. In 1919 he framed his slogan: "We should work independently from politics. The buildings, boilers, beams are needed and so are we". In the later 1930s he retired from engineering work. Shukov died on February 2, 1939 in Moscow and was buried at the Novodevichy Cemetery.

20. Identify the topic of each paragraph of Text 2B.

21. Answer the following questions.

- a) Where was V.G. Shukhov born?
- b) What family was he born into?

- c) Why did the high school teacher praise Vladimir's skills?
- d) Did V.G. Shukhov work as a lecturer in mathematics at the Imperial Moscow Technical School?
- e) Why did V.G. Shukhov go to Philadelphia?
- f) What innovations did V.G. Shukhov bring to civil and ship engineering, working with Bari?
- g) What was V.G. Shukhov's hobby?
- h) Did Shukhov receive any job offers from around the world?

22. Read Text 2C "John Smeaton - the First Civil Engineer" and answer the questions. Discuss your answers with your groupmates.

- a) Why is John Smeaton regarded as the father of the civil engineering profession?
- b) What was John Smeaton's research into power sources?
- c) What was John Smeaton charged with by the President of the Royal Society?
- d) What were John Smeaton's developments in the field of the engineering use of cement and concrete?
- e) Why is the depth of John Smeaton's influence on civil engineering phenomenal?
- f) Why did John Smeaton want practising professional engineers to dine together?
- g) What led to the founding of the Institution of Civil Engineers?

• TEXT 2C

John Smeaton — the First Civil Engineer



John Smeaton

John Smeaton first described himself as a civil engineer in 1768. In doing so, he identified a new profession that was distinct from that of the military engineers who, since ancient times, had undertaken the construction of all public infrastructure. Thus, at the time, civil engineering encompassed all non-military engineering. Although in 1847, after a frenzy of railway construction, mechanical engineering bifurcated from civil engineering as an independent discipline.

An innovative and intelligent man, Smeaton remains one of the most revered professionals of engineering and is regarded as the father of the civil engineering profession.

The son of a Yorkshire lawyer, John Smeaton was born in 1724, in Austhorpe, Leeds, UK. Before his 16th birthday, while still at school, his talent for engineering and use of mechanical tools possessed him to assemble a turning-lathe. Smeaton proceeded to become an instrument-maker. His research into windmills, watermills and other sources of power resulted, in 1754, in a systematic set of scientific experiments that made it clear that an overshot waterwheel is more efficient than an undershot wheel.

In 1756 the President of the Royal Society famously charged Smeaton with the construction of the Eddystone Lighthouse, a structure required to warn ships away from the Eddystone rocks, 14 miles southwest of Plymouth. Smeaton's design, which remains a

symbol of the profession, was completed in 1759 and lasted until 1881.

Smeaton's industry resulted in two developments that made an important contribution to the success of the Eddystone Lighthouse. First, he used a new kind of interlocking stone construction, and second, he developed a water-resistant (hydraulic) mortar to bind the blocks together by mixing blue lime and pozzolanic material from Italy. Smeaton's observation that the best hydraulic cements were those made from limestone containing certain proportions of clayey material are regarded as the starting point of the modern engineering use of cement and concrete.

Today Smeaton remains one of civil engineering heavyweights — the breadth and depth of his influence are phenomenal. In his career, Smeaton designed the first successful Eddystone Lighthouse, greatly improved on Newcomen's steam engine, and designed windmills, watermills, canals and bridges.

John Smeaton died on the 28 October, 1792.

His enduring legacy is more than the engineering works, some of which remain as monuments to the great man himself. Not only is he widely regarded as the founder of the civil engineering profession, but his methods of construction site management and supervision are still in use today. John Smeaton clearly understood that managing people correctly was as important as design and construction.

It was Smeaton's desire that practising professional engineers should dine together — so that they might get to know one another better and thereby avoid potential hostility that might arise in their public dealings — that spawned the formation of the Society of Civil Engineers in 1771.

While the Society remains as a social society today, it is true that the concept of co-operation in competition between engineers led to the founding of the Institution of Civil Engineers in 1818.

Unit 3. JOBS IN CONSTRUCTION

SECTION1

VOCABULARY AND WORD STUDY

1. Read and memorize the active vocabulary to the text “Occupations in the Construction Industry” and translate the given sentences.

1.occupy v — займати

occupation n—рід занять, професія

trade — професія, ремесло; виробництво, промисловість

trade worker (labourer) — виробничий робітник

construction trade worker —будівничий робітник

The family occupied a small flat. Please state your name, address, and occupation. The building industry comprises skilled and unskilled workers in many trades. Having completed the preparation of the site, the trade workers begin the initial stage

2. **contractor** — підрядник
construction contractor —будівельний підрядник
general contractor — генеральний підрядник
subcontractor — субпідрядник

The contractor should also be aware of all the subcontractors so that the best sequence of building operations can be secured.

3. **sewer** — каналізаційний колектор
sewerage — каналізаційна система
install a sewerage system — прокласти (встановлювати) каналізаційну систему

The removal of all kind of liquid waste is usually done by means of sewers which are a part of a sewerage system.

4. **relate (to)** — відноситься , має відношення
closely related — тісно пов'язаний

The form of a building component is related to the way in which it is used
Air-conditioning is closely related to ventilation.

5. **carpentry** — плотниче діло, плотничі роботи
carpenter — плотник, столяр

The coming of the Iron Age brought tools which made possible the development of carpentry. A carpenter checks vertical and horizontal work.

6. **plumbing** — водопровідна система
plumber — водопровідник

Great technological advances have been made in plumbing. As soon as the plumbers have finished their work, the carpenters begin.

7. **schedule** — графік, режим (роботи)
complete a job on schedule — закінчити роботу по графіку

The building was completed on schedule.

8. **plaster** — штукатурка; штукатурить
apply plaster — наносити штукатурку
plasterer n - штукатур

A float (мастерок) is a tool for smoothing the plaster on a wall. The plasterer usually shows up after all the internal walls were built.

9. **reinforce** — зміцнювати , посилювати

reinforcement n — арматура, армірування, зміцнення

To reinforce ordinary concrete structures is to introduce steel rods. There are two kinds of reinforced concrete: with ordinary reinforcement and concrete with prestressed reinforcement.

10. **site n** — місце робіт, територія робіт
construction (building) site — будмайданчик

The site for the new factory has not been decided. The building materials produced are transported to the construction sites.

11. **order n v** — замовлення ; порядок; приказ; замовляти
obtain an order — отримати замовлення
in order to — для того, щоб

Your order is nearly ready. The house is in good order. They ordered some new finishing materials. Careful thought had to be given to the composition of the plastic in order to make it fireproof.

12. **Employ v-** наймати(на роботу); використовувати
employer n — наймач, роботодавець

Only high quality cement should be employed for reinforced concrete work. He asked his employer for a pay rise.

13. **hang (wall)paper** — обклеювати шпалерами
paper hanger — обклейщик шпалер

My wife wants to hang papers on the wall but I would rather paint them. Paper hangers, like most persons who work in the decorating industry, tend to have an eye for colour, texture, and form.

14. **mason n** — муляр; робить кладку
brick mason — муляр
masonry n — цегляна або кам'яна кладка

15. **supervise v** — наглядати, контролювати
supervision n — нагляд, контроль
supervisor n — бригадир, керівник робіт
superintendent n — керуючий, керівник, завідувач.

He *supervised* the labourers on the construction site. He can only operate the machine under *supervision*. *The supervisor* will show you how to work the machine. *The superintendent* is in charge of building.

16. **varnish v** — лак, оліфа; покривати лаком

stain*nv*— фарба; протрава, морилка; фарбувати;

Varnish plays an important role in finishing wooden surfaces. Painted surfaces *are varnished* to enhance their appearance of the paint. *Stain* is used to change the colour of various types of cheap quality wood. The wooden doors *were stained* brown.

17. **partition** — перегородка, внутрішнястіна
Partitions separate space from space.

18. **glaze** *v*— вставляти скло, склити
glazier *n* — скляр

There are different types of glazing compounds that can be used to glaze windows. The heating contractor works at the same time as the glaziers.

19 **insulate** *v*— ізолювати
insulation *n* — ізоляція, ізоляційний матеріал.

Many houses could be warmer if they *were insulated* against heat loss. Mud was used for filling the spaces between bricks and acted as concrete and *insulation*.

20. **finish***nv* — обробка поверхні (результат);
apply finishes— обробляти поверхню
finishing materials— оздоблювальні матеріали

Builders often *finish* surfaces in plastic materials. The natural *finishes* of materials provide the decorative effect. The factory shows some very interesting uses of *finishing materials*.

2. Read and translate the following international words. Look up their transcriptions in the dictionary if necessary. Mind the part of speech.

Segment *n*, general *adj*, residential *adj*, commercial *adj*, infrastructure *n*, tunnel *n*, coordinate *v*, specialize *v*, portion *n*, panel *n*, electrician *n*, communication *n*, select *v*, decorative *adj*, interior *n adj*, exterior *n adj*, asphalt *n*, thermoplastic *n*, column *n*, form *v*, excavation *n*, assist *v*, code *n*, organizational *adj*, phase *n*.

3. Match the words with the definitions below.

- | | | |
|---------------|-----------------|-----------------|
| a) plumber | b) paper hanger | c) supervisor |
| d) contractor | e) employer | f) trade worker |
| g) glazier | h) plasterer | l) mason |
| j) carpenter | | |

1. a person who manages
2. a worker skilled at applying plaster
3. a person who gives a job to others
4. a person skilled at making and repairing wooden objects
5. a person who cuts and fits glass
6. a person skilled at sticking wallpaper on the walls of a room
7. a person who builds or works with stone or brick
8. a person or firm that promises to do work at a fixed rate
9. a skilled worker
10. a person whose job is to fit and repair water pipes, bathroom apparatus, etc

4. Match the English word combinations with the Ukrainian equivalents.

1. to complete on schedule	a. армувати кладку
2. to build a partition	b. керувати проектом
3. to reinforce masonry	c. обробляти поверхню
4. to apply a varnish	d. ставитися до будівництва
5. to install insulation	e. вибирати професію
6. to supervise a project	f. закінчити за графіком
7. to install sewerage	g. наносити штукатурку
8. to relate to construction	h. склити вікно
9. to apply finishes	i. влаштовувати ізоляцію
10. to apply plaster	j. побудувати перегородку
11. to select an occupation	k. прокласти каналізацію
12. to glaze a window	l. нанести лакове покриття

5. Read and translate the following sentences. Pay attention to the meaning of the words and word combinations given below.

- I. a) **finish v** — обробляти
- b) **finish n** — обробка поверхні
- c) **finisher n** — робітник-будівельник
- d) **finishing adj** — остаточна обробка;
- e) **finished adj** — оброблений

I. The wood has a beautiful finish. 2. The finished surface must have a uniform appearance. 3. They showed two good ways to insulate and finish a foundation wall. 4. Sensitive people with allergies or respiratory conditions often request certain finishing materials. 5. A finisher performs the last step in a manufacturing process. 6. After all the interior finishing is done install the carpet so that there is no damage done to it.

- II.** a) **order v** — замовляти; наказувати
 b) **order n** — замовлення; наказ; порядок
 c) **in order that** — стим, щоб
 d) **in order to** — для того, щоб
 e) **out of order** — несправний

1. This company is one of the very few places where you can place an order for lumber and related building materials on-line. 2. The house is in good order. 3. We order high quantities at our suppliers in order not to run out of material during a building phase. 4. You will have to obey my orders. 5. In order to give timber a new chance as a construction material, the different research development and marketing programs should aim at quick usage of the new techniques in timber engineering construction. 6. The machine is out of order. 7. He ordered me to stand up. 8. She checked all her figures in order that the report might be as accurate as possible.

- III.** a) **site n** — ділянка, місце(положення)
 b) **on site** — на будівельному майданчику
 c) **website** — сайт в Інтернеті
 d) **site v** — розташовувати, вибирати місце

1. Protective helmets must be worn on site. 2. The company is trying to decide where to site the new factory. 3. She has a job on a building site. 4. The site for the new factory has not been decided yet. 5. Visit our website to check out the latest deals on building materials. 6. Students in this major prepare for careers managing and inspecting construction sites and buildings.

6. Read and translate the following word combinations which come from the texts of the Unit. Mind the use of nouns as attributes in preposition. Look up your dictionary if necessary.

Construction industry, civil engineering construction contractors, trade contractors, construction trade workers, brick masons, insulation workers, first-line supervisors and managers, construction management occupations, field manager, waste water treatment plants, design and construction processes, specialty trade contractor, conceptual development stage, site preparation, construction site activities.

7. Study the following patterns showing the ways some nouns are formed from verbs and adjectives. Complete the charts with nouns of the following verbs. Some of the missing words are from the texts of the Unit.

Read and translate them into Ukrainian. Use your dictionary to help you with the pronunciation.

Pattern 7

Verb + **-age** -> Noun

The **-age** suffix is used for an action, result, or cost of something.

Example, cover — покривати -> **coverage** — покриття, охоплення

<i>Verb</i>	<i>Noun</i>
sew	_____
Break	_____
Store	_____
Stop	_____
Waste	_____
Pack	_____
use	_____

Pattern 8

Verb + **-al** —> Noun

The **-al** suffix is used for an action of something.

Example, renew — обновлювати > **renewal** — оновлення

<i>Verb</i>	<i>Noun</i>
Remove	_____
Dismiss	_____
Deny	_____
Arrive	_____

Pattern 9

Verb + -ant -> Noun

The **-ant** suffix is used for a person or thing that does an activity.

Example: assist — допомагати —> **assistant** — помічник

<i>Verb</i>	<i>Noun</i>
Consult	_____
Occupy	_____
Inhabit	_____
Account	_____

Pattern 10

VAdjective + -ity -> Noun

The **-ity** suffix is used for quality.

Example: complex - складний -> complexity - складність

<i>Adjective</i>	<i>Noun</i>
Active	_____
productive	_____
fatal	_____
Secure	_____
Formal	_____
Diverse	_____
Creative	_____
Familiar	_____
Responsible	_____
Able	_____
Electric	_____

SECTION 2 GRAMMAR

8.A. Complete the tense chart. Use the verb *make* for the Passive Voice.

PASSIVE	Simple	Continuous
Present	it is <i>made</i>	they are <i>being</i>
Past	it	it
Future	they	
Present Perfect	they	
Past Perfect	it	
Future Perfect	they	

B. Compare the following pairs of the sentences and translate them (Active Voice vs. Passive Voice).

1. They often *discuss* this film. This film *is being discussed* now. 2. They *have discussed* this film for two hours. This film *has been discussed* for two hours. 3. They *discussed* this film yesterday. The film *was discussed* yesterday. 4. They *have just discussed* this film. This film *has just been discussed*. 5. They *were discussing* this film when she came. This film *was being discussed* when she came. 6. They *had discussed* this film when she came. The film *had been discussed* when she came. 7. I think they *will discuss* this film tomorrow. This film *will be discussed* tomorrow. 8. They *will have discussed* this film by the time she comes. The film *will have been discussed* by the time she comes.

9. Rewrite the active sentences as passive ones and translate them.

Example

My relatives *are constructing* the house. — The house *is being constructed* by my relatives.

1. General contractors build residential, industrial and commercial buildings. 2. They were specializing in one type of construction at that time 3. They have just obtained some orders for their work from the general contractor 4 The electricians installed the building electrical systems last week. 5. The insulation workers had covered structures with insulating materials by the end of the week. 6. The plumbers are maintaining many different types of pipe systems now. 7. The plasterers will apply concrete to exterior walls in a week 8 They will have planned the job by the end of the month

10. Complete the following sentences. Use the passive form (Simple, Continuous or Perfect) of the verbs in the brackets.

1. The work (execute) in team now. 2. The first buildings (construct) by hand or with simple tools. 3. By 1993, 1.5 million council houses (sell) in Great Britain. 4. The components (prefabricate), including all welded joints, by the time the construction begins. 5. In the near future, the present structure of Building Construction studies (modify) by the implementation of Bologna Process. 6. Technical changes in the building industry (stimulate) by large housing programs in the recent years. 7. The hotel (build) on the edge of the lake at that time last year. 8. Construction workers (employ) in the construction industry and work predominately on construction sites.

11. Read and translate the following sentences into Ukrainian paying attention to the predicates used in the Passive Voice.

A) Example

At most universities the academic year is divided into three terms.

— У більшості університетів навчальний рік розділений на три семестри.

1. Construction is usually done or coordinated by general contractors. 2. The building materials have been delivered to the construction site on time. 3. Decisions regarding daily construction activities will be made at the jobsite. 4. Management of overseas construction projects usually entails temporary residence in the country in which the project is being carried out. 5. The sites and vehicles had been protected by signs and barricades.

B) Example

He was offered a new job. — Йому запропонували нову роботу.

1. The carpenter will be shown what to do. 2. The supervisor is usually brought papers to sign at 4 o'clock in the afternoon. 3. The trade worker has been asked to bring the tools. 4. They were met at the railway station by their friends. 5. The plumber was told to finish his work on time.

C) Example

The painting was attentively looked at. — На картину дивилися пильнуючи.

1. The brick mason was sent for as he was the only one to do that job. 2. Each student was spoken to separately. 3. This author was referred to in that journal. 4. This building method will be dealt with at the next stage of construction. 5. The final decision was arrived at after two hours discussion.

12. Read and translate the following sentences with emphatic inversion.

1. The individuals included in this development are the basic technical skills that have been removed with respect to socialthe process affects the construction industry. 2. Approach to Office mail in g is a laboratory that can be a

teenager. 3. Care must be taken for each phaseproject. 4. Do not wait until you get such results. 5. Workingwhile designing is any other experts.

SECTION 3 READING AND SPEAKING

13. Before reading Text 3A “Occupations in the Construction Industry”, discuss these questions with your groupmates or teacher.

- a) What segments is the construction industry divided into?
- b) What are the general contractors’ responsibilities?
- c) What is the difference between a general contractor and a specialty trade contractor?
- d) What areas of the construction industry are construction trades workers employed in ?
- e) Who assists construction trades workers?
- f) What are construction managers’ duties?
- g) Who is responsible for completing a project on schedule?.

14. Read Text 3A to find out if you are right or wrong. Use the introductory phrases given in Unit 1.

• **TEXT 3A**

Occupations in the Construction Industry

The construction industry is divided into three major segments. The construction of buildings segment includes contractors called general contractors who build residential, industrial, commercial, and other buildings. Heavy and civil engineering construction contractors build sewers, roads, highways, bridges, tunnels, and other projects related to infrastructure. Specialty trade contractors perform specialized activities related to all types of construction such as carpentry, painting, plumbing, and electrical work.

Construction is usually done or coordinated by general contractors who specialize in one type of construction such as residential or commercial building. They take full responsibility for the complete job, except for specified portions of the work that may be omitted from the general contract. Although general contractors may do a portion of the work with their own crews, they often subcontract most of the work to heavy construction or specialty trade contractors.

Specialty trade contractors usually do the work of only one trade, such as painting, carpentry, or electrical



work, or of two or more closely related trades, such as plumbing and heating. Beyond fitting their work to that of the other trades, specialty trade contractors have no responsibility for the structure as a whole. They obtain orders for their work from general contractors, architects, or property owners.

Construction trades workers are employed in a large variety of occupations that are involved in all aspects of the construction industry. Brick masons build and repair walls, floors, partitions and other structures with brick, panels, concrete block, stone, and other masonry materials. Carpenters construct, erect, install, or repair structures made of wood, such as partitions, putting in doors and windows, building stairs, and laying floors. Electricians install, connect, test, and maintain building electrical systems which can also include lighting, climate control, security, and communications. Glaziers are responsible for selecting, cutting, installing, replacing, and removing all types of glass. Insulation workers line and cover structures with insulating materials. Painters and paperhangers stain, varnish, and apply other finishes to buildings and other structures and apply decorative coverings to walls and ceilings. Plumbers install, maintain, and repair many different types of pipe systems. They may also install heating and cooling equipment and mechanical control systems. Plasterers apply plaster, concrete, and similar materials to interior and exterior walls and ceilings. Roofers repair and install roofs made of tar or asphalt and gravel, rubber or thermoplastic, metal or shingles. Reinforcing iron and metal workers place and install iron or steel girders, columns, and other structural members to form completed structures or frameworks of buildings, bridges, and other structures. Lastly, construction labourers perform a wide range of physically demanding tasks at construction sites, such as excavation, waste removal, and demolition. Many construction trades workers perform their services with the assistance of helpers. These workers assist trades workers and perform duties requiring less skill.

First-line supervisors and managers of construction trades and extraction workers oversee trades workers and helpers and ensure that work is done well, safely, and according to the code. They plan the job and solve problems as they arise. Those with good organizational skills and exceptional supervisory ability may advance to construction management occupations, including project manager, field manager or superintendent. These workers are responsible for getting a project completed on schedule by working with the architect's plans, making sure that materials are delivered on time, assigning work, overseeing craft supervisors, and ensuring that every phase of the project is completed properly and expeditiously. They also resolve problems and make sure that work proceeds without interruptions.

15. Find in Text 3A the paragraph describing different construction trades workers' occupations and translate it into Ukrainian.

16. Read aloud paragraphs 2-3.

17. Explain the following references.

a) *they* often subcontract most of the work to heavy construction or specialty trade contractors.

What does the pronoun *they* refer to?

b) *They* often obtain orders for their work from general contractors, architects, or property owners

What does the pronoun *they* refer to?

c) *These* workers assist trade workers .

What does the demonstrative adjective *these* refer to?

d) *They* also resolve problems and make sure that work proceeds without interruptions.

What does the pronoun *they* refer to?

e) *They* may also install heating and cooling equipment What does the pronoun *they* refer to?

18. Underline or mark the main ideas of Text 3A and retell it in English.

19. Skim Text 3B “Construction Managers” and try to understand what it is about and what information is new to you.

TEXT 3B

Construction Managers

Construction managers plan, direct, coordinate, and budget a wide variety of construction projects, including the building of all types of residential, commercial, and industrial structures, roads, bridges, wastewater treatment plants, and schools and hospitals. Construction managers may supervise an entire project or just part of one. They schedule and coordinate all design and construction processes, including the selection, hiring, and oversight of specialty trade contractors, such as carpentry, plumbing, or electrical, but they do not usually do any actual construction of the structure.

Construction managers are managers who oversee construction supervisors and personnel. They are often called project managers, constructors, construction superintendents, project engineers, construction supervisors, or general contractors.

These managers coordinate and supervise the construction process from the conceptual development stage through final construction, making sure that the project gets completed on time and within the budget. They often work with engineers, architects, and others who are involved in the process. Given the designs for buildings, roads, bridges, or other projects, construction managers supervise the planning, scheduling, and implementation of those designs.

Large construction projects, such as an office building or an industrial complex, are often too complicated for one person to manage. Accordingly, these projects are divided into various segments: site preparation, including clearing and excavation of the land, installing sewage systems, and landscaping and road construction; building construction, including laying foundations and erecting the structural framework, floors, walls, and roofs; and building systems, including protecting against fire and installing electrical, plumbing, and air-conditioning systems. Construction managers may be in charge of one or several of these activities.

Construction managers determine the best way to get materials to the site and the most cost-effective plan for completing the project. They divide all required construction site activities into logical steps, estimating and budgeting the time required to meet established deadlines. Doing this may require sophisticated scheduling and cost-estimating techniques using computers with specialized software.

Construction managers also manage the selection of general contractors and trade contractors to complete specific phases of the project which could include everything from structural metalworking and plumbing to painting, installing electricity and carpeting.

Construction managers determine the labour requirements of the project and, in some cases, supervise the hiring and dismissal of workers. They oversee the performance of all trade contractors and are responsible for ensuring that all work is completed on schedule.

Construction managers direct and monitor the progress of construction activities through construction supervisors or other construction managers. They are responsible for obtaining all necessary licenses and, depending upon the contractual arrangements, for directing or monitoring in compliance with building and safety codes, other regulations, and requirements set by the project insurers. They also oversee the delivery and use of materials, tools, and equipment, workers' safety and productivity, and the quality of the construction.

Working out of a main office or out of a field office at the construction site, construction managers monitor the overall construction project. Decisions regarding daily construction activities are generally made at the jobsite.

Managers might travel considerably when the construction site is not close to their main office or when they are responsible for activities at two or more sites. Management of overseas construction projects usually entails temporary residence in the country in which the project is being earned out.

20. Find in Text 3B the information about construction managers' duties and responsibilities in the following areas and describe them:

- a) design process coordination;
- b) supervision of a project;
- c) contractual arrangements;
- d) personnel's selection and overseeing;

e) construction site activities.

21. Say whether you agree or disagree with the views expressed in Text 3B. Prove your points of view

22. Read Text 3C “Construction Site Safety” and find the answers to these questions. Discuss your answers with your groupmates or teacher.

- a) Why is construction considered to be the most dangerous working area?
- b) Why is it difficult to control work environment?
- c) What are the main safety hazards on site?
- d) Who is regarded as a non-worker?
- e) What are safety signs and barricades urgently required at construction sites?
- f) What regulations and organizations place requirements on employers to protect workers' safety?

TEXT 3C

Construction Site Safety

Construction is the most dangerous land based work sector in Europe (the fishing industry being more dangerous). In the European Union, the fatal accident rate is nearly 13 workers per 100,000 as against 5 per 100,000 for the all sector average.

In the U.S. there were 1,225 fatal occupational injuries in the construction sector in 2001 with an incidence rate of 13.3 per 100,000 employed workers. For the same year the construction industry experienced 481,400 nonfatal injuries and illnesses at a rate of 7.9 per 100 full-time workers in the industry. Construction has about 6% of U.S. workers, but 20% of the fatalities — the largest number of fatalities reported for any industry sector.

The problem is not that the hazards and risks are unknown, it is that they are very difficult to control in a constantly changing work environment.

The leading safety hazards on site are falls from height, motor vehicle crashes, electrocution, machines, and being struck by falling objects. Some of the main health hazards on site are asbestos, solvents, noise, and manual handling activities.

Many construction sites cannot completely exclude non-workers. Road construction sites must often allow traffic to pass through. This places non-workers at some degree of risk.

Road construction sites are blocked-off and traffic is redirected. The sites and vehicles are protected by signs and barricades. However, sometimes even these signs and barricades can be a hazard to vehicle traffic. For example, improperly designed barricades can cause cars that strike them to roll over or even be thrown into the air. Even a simple safety sign can penetrate the windshield or roof of a car if hit from certain angles.

Under European Union Law, there are European Union Directives in place to protect workers, notably Directive 89/391 (the Framework Directive) and Directive 92/57 (the Temporary and Mobile Sites Directive). This legislation is transposed into the Member States and places requirements on employers and others to assess and protect workers' health and safety.

In the United States the Occupational Safety and Health Administration sets and enforces the standards concerning workplace safety and health.

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