

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ЦЕНТРАЛЬНОУКРАЇНСЬКИЙ НАЦІОНАЛЬНИЙ
ТЕХНІЧНИЙ УНІВЕРСИТЕТ
КАФЕДРА ІНОЗЕМНИХ МОВ

*Методичні рекомендації для студентів ЗВО
всіх форм навчання*

**Англійська мова
для студентів спеціальності
«Будівництво та цивільна інженерія»**

Частина 1

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Методичні рекомендації призначені для вивчення англійської мови як мови професійного спрямування для студентів спеціальності будівництва та цивільної інженерії. Для ознайомлення та обговорення пропонуються тексти та завдання різного рівня складності. Структурно методичні рекомендації складаються з трьох частин. До кожного тексту пропонуються запитання та завдання, які сприяють кращому розумінню обговорюваного матеріалу; вправи на переклад з української мови на англійську, що в комплексі із читанням, перекладом та обговоренням текстів – сприяє розвитку комунікативної мовленнєвої компетенції студентів, та забезпечує діяльнісно-орієнтований підхід до вивчення іноземної мови.

Рекомендовано студентам денної, очної, заочної та дистанційної форм навчання.



TEXT № 1

Before-Reading

1. *Discuss the following:*

- What is cultural heritage?
- Is it important for us to know our cultural heritage? Why?
- What is a role of architecture in our life?
- What is architecture?

2. *Try to guess the meaning of the following words. Use the dictionary if you need:*

- structural principles
- art of building
- basic factors in architecture
- architectural design
- aesthetic appearance of buildings
- sufficient knowledge of engineering
- theory of architecture
- building materials
- philosophers
- historians
- harmonious

3. *Make up your own sentences with the following words:*

Architecture (архітектура), *economic requirements* (економічні потреби), *nations and generations* (нації і покоління),

historical background (історичне походження), *cultural heritage* (культурна спадщина), *sufficient knowledge of engineering* (достатні знання інженерії), *creative imagination* (творча уява).

While-Reading

1. Reading for general understanding. Read the text. Think of a good title for it. Compare it with other students' titles.

2. Read and translate the third paragraph from the text:

The science of building is Architecture. Any engineer cannot take a form of the building without consideration of structural principles, materials, social and economic requirements. So a building cannot be considered as a work of architecture. From the very beginning architecture of many skills, systems and theories have been used for the construction of the buildings that men have housed in all their essential activities. The coexistence of change and survival is evident in all phases of the human story. This change and repetition is clearly illustrated in any architectural style. The historical background of architecture is the value of our cultural heritage. The heritage of the past cannot be ignored. Such recognition of continuity does not imply repetition or imitation. It must be expressed in contemporary terminology.

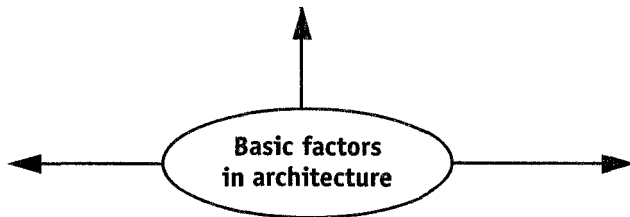
Writing on architecture is almost as old as writing itself. There are a lot of books on the theory of architecture, on the art of a building and on the aesthetic appearance of buildings. The oldest book is a work of Marcus Vitruvius Pollio, written in the first century B.C. Nearly two thousand years ago the Roman architect Vitruvius set the principles upon which buildings should be designed and aims to guide the architect. He was the first who listed three basic factors in architecture — "convenience, strength and beauty". The sequence of these three basic aims — "convenience, strength and beauty" — has its own significance. These three factors are always

present and are always interrelated in the best structures. It is impossible for a true architect to think of one of them without considering the other two as well. Thus architectural design entails a consideration of the constant interaction of these factors. At last we can say that every element in a building has a triple implication. At the same time its contemporary expression must be creative and consequently new.

Architecture is an art. The triple nature of architectural design is one of the reasons why architecture is a difficult art. The architect does not first plan a building from the point of view of convenience, then designs around his plan a strong construction to shelter it, and finally adjusts and decorates the whole to make it pretty. It takes him a special type of imagination as well as long years of training and experience to produce a designer capable of making the requisite in the light of these three factors — "use, construction, aesthetic effect" — simultaneously. First of all, the designer must have sufficient knowledge of engineering, building materials to enable him to create economically. I see, any building is built because of some definite human need. The use problem — "convenience" — is therefore primary. In addition, the designer must possess the creative imagination which will enable him to integrate the plan and the construction into one harmonious whole. The architect's feeling of satisfaction in achieving such as integration is one of his greatest rewards.

3. Read the text again and find the main idea of each paragraph.

4. Read the text once more and complete the spidergram:



5. Read the text again and complete the following sentences:

- Architecture is art...
- ...finds little place...
- ...in any architectural style.
- ...change and repetition is clearly illustrated...
- Nearly two thousand years ago...
- ...in all phases of the human story.
- The designer must have a...
- ...have taken great pains...
- ...is one of his greatest rewards.
- ...The heritage of the past...

6. Read the following statements and say whether they are true or false. Correct the false statements:

- The historical background of nineteenth-century architecture finds little place in this article.
- The heritage of the past cannot be ignored.
- This triple nature of architectural design.
- Nearly five thousand years ago the Roman architect Vitruvius listed three basic factors in architecture.
- The designer must have a sufficient knowledge.
- Architecture is the sport.
- Paradox of change and repetition is clearly illustrated in any architectural style.
- The architect's feeling of love is one of his greatest rewards.
- Of any truly great building we can say that every element in it has a triple implication.
- It is impossible for the true architect.

After-Reading

Grammar focus

1. *Complete the following words from the text:*

int_grat_on, _rchit_ct_ral, d_si_n, c__str_cti_n, ae_th_ti_,
e_f_ct, _pn_eni__ce, st_ngjti, be__ty, st_u_tu_al, pr_nc__pl_s,
m_ter_als, so_ial, _con_mi_, re_uir_m_ts, es_e_ti_l, a_ti_it_es.

2. *Make the following sentences negative and put into the interrogative form:*

- Architecture is the art and the science of building.
- Books on the theory of architecture, on the art of a building, and on the aesthetic appearance of buildings exist in fair number.
- The designer must have sufficient knowledge of engineering and of building materials.
- Architecture is a difficult art.
- The architect's feeling of satisfaction in achieving such as integration is one of his greatest rewards.

3. *Find all the sentences where the professional terminology is used, read and translate them. Write the professional terminology.*

4. *Write down all the nouns from the text in plural.*

5. *Write down all irregular verbs and their three forms.*

6. *Find all the sentences from the text in the Passive Voice. Copy them in your exercise-books.*

7. Complete the table (pay attention to degrees of comparison):

structural		
special		
difficult		
sufficient		
		the greatest
strong		
creative		
true		
essential		
architectural		

Get-talking

- 1. Make up a plan to the text.**
- 2. Imagine you are a future skilled engineer. Say some words about basic factors in architecture. Your talk should last a minute.**



TEXT № 2

DESIGN AND BUILD

Before-Reading

1. *Discuss the following:*

- What do you know about various cultures?
- What is their cultural heritage?

2. *Try to guess the meaning of the following words. Use the dictionary if you need:*

- monument
- building
- structure
- civil engineering
- various cultures
- mobile
- infrastructure
- architect
- pyramids
- conception
- industrial revolution
- design
- final structure
- selection of materials
- type

- size
- mechanical design

3. *Make up your own sentences with the words from Ex 1.*

While-Reading

1. *Reading for general understanding. Read the text and answer the following questions to the text:*

- Have various cultures left their imprint on history through their great or small monuments and buildings?
- Great architect and engineers followed an integrated process of conception, design and construction, didn't they?
- Did this integrated construction process persist through the end of the nineteenth century?
- What is the structural design?
- What does engineering of stationary objects such as buildings and bridges imply?

We can not ignore the heritage of the past. There are different styles and kinds of architecture in the past around the world. It is not a secret, that various cultures have left their imprint on history through their great monuments and buildings, great castles and cathedrals. The oldest monuments which are met within architecture are great structures such as Egyptian pyramids, the Parthenon in Athens, the Roman Pantheon, and Hagia Sophia in the "New Rome", Constantinople, great castles and cathedrals of the Middle Ages, the palaces of the Renaissance and the civil engineering infrastructure of the industrial revolution. Great architects and engineers followed an integrated process of conception, design and construction. This integrated construction process persisted through the end of the nineteenth century, when the Roebling family (John, Washington, and Emily) designed and built the Brooklyn Bridge.

It is necessary to select materials, a type, a size and a configuration to carry loads in a safe and serviceable fashion. The architects and engineers mobilize the resources needed to realize the final structure. This classical approach is used to build. In general, structural design implies engineering of stationary objects such as buildings and bridges, objects that may be mobile but have a rigid shape such as ship hulls and aircraft frames. But it is an area of mechanical design, to which devices are generally assigned. These are devices with parts planned to move with relation to each other.

2. Read and translate the first paragraph from the text.

3. Read the text again and complete the following sentences:

- Various cultures have left
- These great structures were
- This classical approach was used
- This integrated construction process persisted
- Devices with parts planned to move with

4. Read the following statements and say whether they are true or false. Correct the false statements:

- Various cultures have left their imprint on history.
- This classical approach was used to build the great stadiums.
- Great architects and engineers followed an integrated process of conception, design, and construction.
- This integrated construction process persisted through the end of the first century.
- The selection of materials and member type, size and configuration to carry loads in a safe and serviceable fashion.

After-Reading

Grammar focus

1. Complete the following words from the text:

mon__me__t, s__le__tio__, m__eri__l, str__ct__e, s__ze, f__sh__n.
__onf__gu__tion, me__an__cal, __nd__str__al, rev__lut__on, c__nstru__ion,

2. Write down all the nouns from the text in plural.

3. Make the following sentences negative and put into the interrogative form:

- These great structures were by "master building or monument".
- Great architects and engineers followed an integrated process of conception, design, and construction.
- The selection of materials and a type, a size and configuration to carry loads in a safe and serviceable fashion is necessary.

4. Find all the sentences from the text with the forms of the verb "to be". Copy them in your exercise-books.

5. Translate from Ukrainian into English:

- Різні культури залишили слід в історії.
- Це великі пам'ятники і будівлі, єгипетські піраміди: Парфенон в Афінах, римському Пантеоні і Хагія Софії в «Новому Римі», Константинополі.
- Ми не маємо права ігнорувати спадщину минулого.
- Архітекторам і інженерам необхідно використовувати всі ресурси, потрібні для завершення споруди.

Get talking

1. *Imagine you are a future skilled engineer. Say some words about structural design. Your talk should last a minute.*

2. *Prepare reports about great monuments and buildings of Ukrainian architects and engineers. A report should include 2000 – 3000 words.*



TEXT № 3

THE EGYPTIAN PYRAMIDS

Before-Reading

1. Discuss the following:

- What the oldest monuments of architecture do you know?
- What pyramids do you know?

2. Try to guess the meaning of the following words. Use the dictionary if you need:

- sort of material
- different styles
- triangular buildings
- colossal pyramids
- civilization
- ancient Egypt

3. Make up your own sentences with the words from Ex.1.

While-Reading

1. Reading for general understanding. Read the text and answer the following questions to the text;

- What problems did the Egyptian architects have?

- What materials were for construction of pyramids used?
- What is an Egyptian pyramid?
- What interesting facts do you know about the Egyptian pyramids?
- What do they tell us about civilization?

It was mentioned, that Architecture is the science of building. A man who designs buildings and makes the plans for them is called an architect. First of all, an architect has to think what he wants to build. He must not forget what it is to be used for. He must not forget the sort of material to be used in the building. It may be stone, a brick, wood or steel and concrete.

We know that Architecture is the art, which makes buildings beautiful to look at. There were many different styles or kinds of architecture in the past. Now they tell us about advanced civilization of ancient countries. One of the oldest monuments, constructed about 6.000 years ago, are the colossal pyramids of Egyptian. The pyramids are large triangular buildings which were placed over the tombs of Egyptian kings. The best known of the pyramids are a group of three built at Giza south of Cairo. The largest of these is 482 feet high. There are many building of different styles today in different parts of the world, which are much spoken about in our days.

2. Read and translate the text.

3. find and translate all the sentences containing the following words:

- Different styles
- triangular buildings
- a sort of material
- an advanced civilization
- make the plans, kinds of architecture

4. Read the text again and complete the sentences:

- ...many different styles or kinds...

- ...the sort of material to be used...
- ...are a group of three built at...
- ...which are met within architecture...
- ...man who designs...
- They tell us of the advanced...
- He must not forget...
- Architecture is the art...
- ...to think not only of what...
- The largest of these is...
- ...the colossal pyramids...

**5. Read the statements and say whether they are true or false.
Correct the false statements:**

- The oldest monuments were constructed about 4,000 years ago.
- A man who designs buildings and makes the plans for them is called the singers.
- The pyramids are large square buildings.
- Architect must not forget the sort of material to be used in the building.
- The largest of pyramids is 582 feet high.
- Architecture is the art which makes buildings beautiful to tell at as well as useful.
- The best known of the pyramids are a group of three built at Giza south of Cairo.
- Architect thinking about the sort of material to be used in the building.
- Architect has to think not only of what he wants the building to look like when it is finished, but also what it is to be used for.
- Monuments which are met within architecture are the colossal pyramids of Egyptian.

After-Reading

Grammar focus

1. Write all the following nouns in plural:

a day, a civilization, a group, a king, a tomb, a year, a pyramid, a monument, a world, a kind, a style, a concrete, steel, wood, a brick, a stone, a material, a sort, a plan, a building, an art, an architecture.

2. Complete the table (pay attention to degrees of comparison):

useful		
different		
		the oldest
colossal		
		the most
large		the largest
triangular		
		the best
high		
ancient		

3. Write the words in the correct order to make sentences and translate them into Ukrainian:

- Is, architecture, art, the.
- The, of, past, have, in, been, different, kinds, there, or, architecture, styles, many.
- Large, are, triangular, pyramids, the, buildings?
- He, of, the, not, the, be, sort, material, must, forget, to, used, in, building.
- Stone, this, and, be, brick, wood, may, or, concrete, steel.

4. Find all the sentences from the text in the Passive Voice. Copy them in your exercise-books.

5. Translate from Ukrainian into English:

Архітектор – людина, яка проектує будівлі. Архітектор повинен поклопотатися як про зовнішній вигляд будівлі, так і про його придатність до використання. Будівельними матеріалами можуть бути камені, цегла, сталь і ін. Один з прадавніх пам'ятників архітектури – Єгипетські піраміди. Вони (піраміди) можуть розповісти нам про багато загадок минулих цивілізацій. Біля Каїра розташовано три найвідоміші піраміди.

Get talking

1. Make up a dialogue about the Egyptian pyramids. It should include 20 phrases.

2. Prepare reports about great colossal pyramids of Egypt. A report should include 2000—3000 words.



TEXT № 4

FORMS AND FUNCTIONS OF ARCHITECTURE

Before-Reading

1. *Discuss the following:*

- What do you know about a work of a real architect?
- What do you think about the value of true architecture?
- What forms of architecture do you know?
- There are some who claim that architecture is not a fine art at all. Do you agree or disagree?

2. *Try to guess the meaning of the following words. Use the dictionary if you need:*

- value of true architecture
- physical structure
- variations of plane, colour, shade
- escalator
- elevator
- hall
- corridor
- human activities
- to create a work of architecture
- adequate structure
- civilization
- decorative elements

- drawing
- design
- actual building

While-Reading

1. *Read the text and find new words from the text.*

2. *Read the text again and translate the first paragraph:*

First of all, the value of true architecture lies in the direct effect of the structure itself. It depends on many reasons. One of them is a drawing. Drawings are works of architecture. An architect uses drawings to achieve his objective. In fact, drawings can represent buildings only on paper. It is called "paper architecture". We mean the result of architect's thinking of drawings. But, there is a danger of "paper architecture". The architect mustn't forget that many elements which look well on a drawing may be either completely ineffective or definitely harmful in the actual building. For example, it is electric architecture. Electric buildings are full of decorative elements which look well on the drawing. Perhaps even seem necessary on the drawing. But in the actual buildings they are completely meaningless. An architect is able to see variations of a plan, of color and a shade. Each of these variations is due to the effects of light on the building materials employed. The architect must always study each detail from the viewpoints of both use and appearance as well as from that of construction. He must not see it as an isolated detail but as an individual note in a great composition. A work of an architect exists only when it stands a complete, concrete object for all to see or to use.

The architect must project an integration of the whole in order to create a work of architecture. He must remember about the architect's alphabet. Knowledge of this alphabet is as essential to him as knowledge of words to the writer or of notes to the musician.

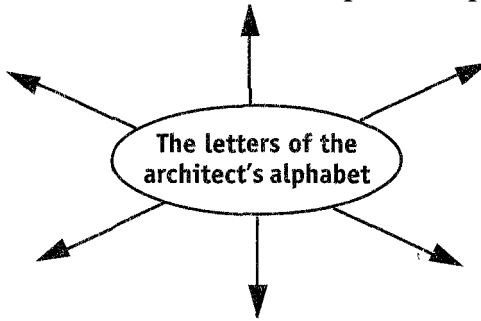
The letters of the architect's alphabet are such elements as walls and openings, supports and ceilings, enclosed areas or rooms. We enter the building and our attention meets the same complexity of elements. They are doors to allow ingress and egress; windows to admit light and air; walls for shelter or support; roofs to keep out the rain, snow, cold, and sometimes sun. A partition separates space from space. There may be stairs, escalators, or elevators to allow progress from level to level and halls or corridors to permit easy circulators from part to part. Finally there may be all sorts of interior spaces for definite human activities — rooms both public and private — to take care of the varying functions of human living. No building can exist without some of them.

Any true architectural design is no mere fantasy, no unreal dream. It contemplates an actual building. There must be adequate structure for a building to exist. Then we observe the physical structure of a building outside. Next, "strength" becomes the second necessity for the construction. A true construction must stand up solidly.

Finally, mankind has always realized that buildings to be complete must have not only "convenience" and "strength", but also "beauty". Some people think that architecture is not a fine art at all. For such people the world of fine arts is something entirely set apart from ordinary living and that its single purpose should be satisfying of physical necessities. At the same time architecture is a matter of pictures or sculpture, poems or music. The architect has the task of being an artist as well as an inventive engineer. The expression of the purpose of buildings would seem to call for additional thought on this point. The emotions are evoked by beauty. It may be theaters, churches, dwellings and buildings, which always differ from one another. Yet a separate consideration of an individual building is a very real artificial sense.

3. Read the text again and find the main idea of each paragraph.

4. Read the text once more and complete the spidergram:



5. Read the text again and complete the following sentences:

- The value of true architecture...
- ...must always study each detail...
- We enter the building...
- ...on the building materials employed.
- A knowledge of this alphabet...
- ...must be a true...
- ...as things in themselves.
- ...uses drawings to achieve...
- The danger of...
- ...to point out...
- ...in the actual building.
- Paper architecture...
- ...is the result of thinking...
- ...they are completely meaningless.
- A valid criticism against...

6. Read the following statements and say whether they are true or false. Correct the false statements:

- The value of true architecture lies in the direct effect of the structure itself.
- Inside we observe the physical structure.

- We see variations of plane, of color and shade.
- The architect must never study each detail.
- Any building exists for some particular purpose.
- For such people, the world of fine arts is something negative.
- The engineer has the task of being an artist as well as an inventive architect.
- The construction of any object must be a true construction.
- There are doors to allow ingress and egress.

After-Reading

Grammar focus

1. Find all the sentences where the professional terminology is used, read and translate them. Write the professional terminology.

2. Make the following sentences negative and put into the interrogative form:

- A partition separates space from space.
- The value of true architecture lies in the direct effect of the structure itself.
- The architect must always study each detail from the viewpoints of both use and appearance.
- He must continuously see it not as an isolated detail but as individual note in a great composition.
- The architect has the task of being an artist as well as an inventive engineer.
- The sequence of these three basic aims — "convenience, strength and beauty" — has its own significance.
- The expression of the purpose of buildings would seem to call for additional thought on this point.
- Any true architectural design is mere fantasy, unreal dream, but contemplates an actual building.
- For a building to exist there must be adequate structure.

- Such elements — walls and openings, supports and ceilings, enclosed areas or rooms — are the letters of the architect's alphabet.
- There are doors to allow ingress and egress; windows to admit light and air; walls for shelter or support, or both; roofs to keep out the rain, snow, cold, and sometimes sun.
- The architect uses drawings to achieve his objective.
- A work of architecture exists only when it stands complete.
- The dangers of "paper architecture" are very small.
- Paper architecture is the result of thinking of engineers.
- In fact, drawings can't represent buildings only symbolically.

3. Find all the sentences containing modal verbs "must", "can". Copy them in your copy-books.

4. Find all the sentences from the text with the forms of the verb "to be". Copy them in your exercise-books.

5. Write down all irregular verbs and their three forms.

6. Complete the table (pay attention to degrees of comparison):

strict		
adequate		
fine		
human		
physical		
magnificent		
political		
harmful		
separate		
economic		

7. Write down all the nouns from the text in plural.

Get talking

- 1. *Make up a plan to the text.***
- 2. *Work in pairs. Discuss: a) forms of architecture;
b) functions of architecture.***

Your dialogues should include 20 phrases.



TEXT № 5

EMERGENCE OF DESIGN PROFESSIONALS

Before-Reading

1. *Discuss the following:*

- How many societies representing the building design professions do you know?
- What architects of the Renaissance do you know?

2. *Try to guess the meaning of the following words. Use the dictionary if you need;*

- regulation
- role
- process
- mathematical models in building
- professionalism
- nation building codes
- model of licensed professions
- discipline

3. *Make up your own sentences with the following words:*

New building types (нові проекти будівель), *a building science* (наука про будівництво), *licensed professional* (ліцензований)

професіонал), *a rise of professionalism* (зростання професіоналізму), *responsibility of an architect* (обов'язок архітектора), *an industrial age* (століття індустріалізації), *large-scale buildings* (великомасштабні будівлі).

While-Reading

1. *Read the text and find new words from the text.*

2. *Reading for specific information. Read the text and answer the following questions to the text:*

- When was a major change in the role of the architect?
- What was the response of the architect?
- One of the first buildings for which the architect and engineer were separate persons was the Granary in Paris, wasn't it?
- Were old societies representing the building or writing design professions found?

We have mentioned that architecture is a science of building. On one hand, coming of a building science also marked a major change in the role of an architect. The response of the architect was to develop a new role of licensed professional on the model of licensed professions such as law and medicine. It meant a bewildering range of new building types. On the other hand, with coming of a building science, there was a further division of labour in the design process. Some new disciplines appeared to teach engineers and architects. One of them was structural engineering as a separate discipline specializing in the application.

We know that for building an architect and an engineer are needed. One of the first buildings for which an architect and an engineer were separate persons was the Granary (1811) in Paris. The building design professions were founded, including the Institute of Civil Engineers (1818) and the Royal Institute of British Architects (1834), both in London, and the American Institute of Architects

(1857). Official government licensing of architects and engineers was not realized until beginning with the Illinois Architects Act of 1897. With the rise of professionalism was the development of government regulation, which took the form of detailed municipal and nation a building codes specifying both prescriptive and performance requirements for buildings.

3. Find and translate all the sentences containing the following words:

- coming of a building science
- structural engineering
- building design professions
- building codes

4. Read the text again and complete the following sentences:

- Coming of the industrial age also...
- The response of the architect was...
- One of the first buildings...
- With the rise...
- On the other hand, with the coming of a building science...
- Official government licensing of...

5. Read the following statements and say whether they are true or false. Correct the false statements:

- Coming of the renaissance age also marked a major change in the role of the engineer.
- Two of the first buildings for which the architect and engineer was separate person were the Granary (1800) in Paris.
- Societies representing the building design professions were not founded.
- We know that for building an architect and an engineer are needed.
- One of them was structural engineering as a separate discipline specializing in the application.

After-Reading

Grammar focus

1. Complete the following words from the text:

S_ien_e, gov__nme_t, r_spon_e, co_mi__ ion, des__n,
m_di__ine, reg_la__on, ma_ket, inst_tut_, of_ici_l, p_tron,
di_cipl_ne, s_c_ety, div_si_n, labo_r, demo_ra_y.

2. Find all the sentences where the professional terminology is used, read and translate them. Write the professional terminology.

3. Find all the sentences where the dates are used, read them and translate. Write the dates in letters.

4. Write down all the nouns from the text in plural,

5. Put "was" or "were" in.

- The response of the architect to develop the new role of licensed professional on the model of licensed professions such as law and medicine.
- Concurrent with the rise of professionalism the development of government regulation, which took the form of detailed municipal and nation building codes specifying both prescriptive and performance requirements for buildings.
- There a further division of labour in the design process.
- Societies representing the building design professions founded, including the Institute of Civil Engineers (1818) and the Royal Institute of British Architects (1834), both in London, and the American Institute of Architects (1857).

- One of the first buildings for which the architect and engineer separate persons the Granary (1811) in Paris.
- Official government licensing of architects and engineers, goal of these societies, not realized until much later, beginning with the Illinois Architects Act of 1897.

6. Translate from Ukrainian into English:

Головні архітектори Ренесансу знаходилися під подвійним контролем церкви і держави, від яких залежали їх повноваження. В зростаючій індустріальній демократії, що залежить від ринку, зростала кількість будівель, гідних уваги архітекторів, а замовники вимагали, щоб діапазон нових будівель розширювався. Крім того, з приходом науки про будівлі відбувалося подальше розділення в дизайнерському процесі: структурне інженерне мистецтво з'явилося як розділення дисциплін, що спеціалізуються на додатку математичних моделей в будівництві. Однією з перших будівель, для яких сталося розділення функцій архітектора і інженера, було Granary в Парижі.

Get talking

1. Discuss in pairs. Make up a dialogue about «A major change in the role of the architects». It should include 20 phrases.

2. Prepare reports about well-known large-scale buildings in the world. A report should include 2000—3000 words.



TEXT № 6

A CONTRACT BETWEEN THE CLIENT AND THE CONTRACTOR

Before-Reading

1. *Discuss the following:*

- What do you know about a contract?
- Have you signed any contract?

2. *Try to guess the meaning of the following words. Use the dictionary if you need:*

- commission for a building
- client
- preliminary plans
- building contractors
- correct any defects
- exact dimension of every part of the building
- final design

While-Reading

1. *Mending for general understanding. Skim read the text. Think of a good title for it. Compare it with other students' titles.*

2. *Reading for general understanding. Read the text, choose a right word.*

After receiving (*commission, a plan, money*) for a building, an architect meets a (*client, friend, relative*) and discusses his requirements. After visiting the site, the architect draws up a preliminary plan. Then the architect submits the (*cost, price, money*) to the client for his approval. If the client suggests anything, the architect incorporates them into the final design. Only the final design shows the exact dimension of every part of the building. At this (*stage, level*) several building contractors are invited to bid for the job of constructing the building. When they submit their tenders or prices, the architect assists his client in selecting the best one and helps him to draw up a (*contract, picture*) between the client and the contractor.

Then a work starts on the (*building, lesson*). The architect makes periodic inspections to make sure that the building is being constructed according to his plans and that the (*materials, instruments*) specified in the contract are being used. The client pays the (*bills, work*) from the contractor during the building period. At the end of the building the contractor completes the (*building, work, and lesson*) and the client occupies it. After completing there is a (*period, time*) known as the "defects liability period". During this period the (*contractor, client*) must correct any defects that have appeared in the fabric of the building. Finally, when all the defects have been corrected, the client takes full (*possession, work*) of the building.

3. Read and translate the second paragraph from the text.

4. Reading for general understanding. Read the text again and answer the following questions to the text:

- When does an architect meet the client?
- When does an architect draw up preliminary plans?
- When are building contractors invited?
- When does an architect make periodic inspection?

- What is the "defects liability period"?
- When does the client take full possession of the building?

5. Now find a word or an expression in the passage which means:

- to be given the job of designing a building
- to offer to a client for his consideration
- to offer to do some work at a certain price
- to look at the building work in detail at regular intervals
- an interval of time after the building has been finished
- a contractor is responsible for correcting any faults in it
- to have complete ownership of the building

After-Reading

Grammar focus

1. Write all the following nouns in plural:

An architect, a commission, a building, a client, a cost, a dimension, a price, a lender, a contract, a material, a period, a defect.

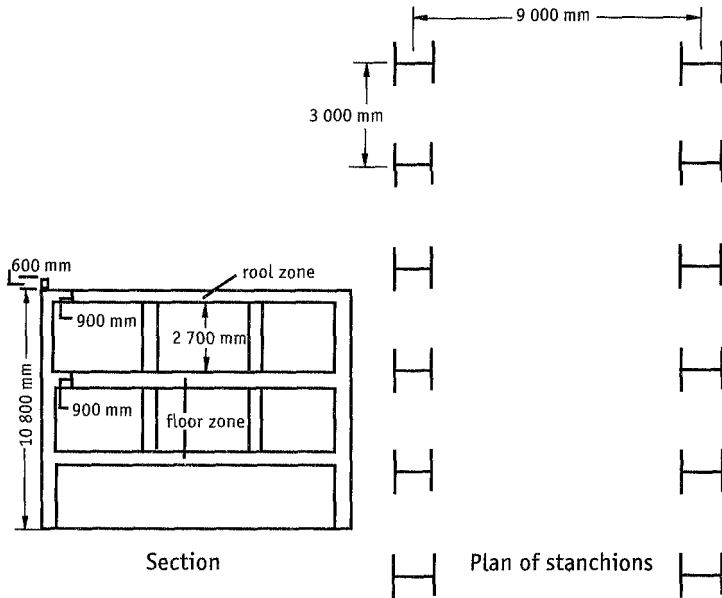
2. Write the following words in correct order to make sentences and translate them:

- An, meets, the, architect, his, requirements, and, client, discusses.
- The, draws, architect, plans, up, preliminary:
- The, takes, of, possession, the, building, full, client, the, building.
- The, occupies, contractor, and, completes, it, building, client, the.
- The, work, building, now, starts, on.

3. Find all the sentences from the text with the forms of the verb "to be". Copy them in your exercise-books.

4. Look at these drawings of the same building. Make up sentences saying what the dimensions marked on the drawings are:

Example. The floor to ceiling height is 2 700 mm.



Get talking

1. Imagine you are a future skilled architect. Say some words about "A contract between the client and the contractor". Your talk should last a minute.



TEXT № 7

THE ARCHITECTURAL ENGINEERING

Before-Reading

1. *Discuss the following:*

- What are technological aspects of buildings?
- Do you want to be an architectural engineer?

2. *Try to guess the meaning of the following words. Use the dictionary if you need:*

- technical detail
- building material
- illumination
- master builder
- to wall construction
- wall line
- structural design
- architectural engineering
- technological aspect
- environmental system
- communication
- monument
- mechanical code
- construction techniques in buildings

3. Match the following words with their Ukrainian equivalents:

- | | |
|-----------------------------|---------------------------|
| • fire protection | • управління будівництвом |
| • fair conditioning | • корпус судна |
| • storm drainage | • пам'ятник |
| • architectural engineering | • інженер-архітектор |
| • a monument | • собор |
| • construction management | • пожежна безпека |
| • a castle | • штурмувати дренаж |
| • a cathedral | • вантаж |
| • a load | • замок |
| • a ship's hull | • кондиціонування |

While-Reading

1. Reading for general understanding. Skim read the text. Think of a good title for it. Compare it with other students' titles.

Engineering is a complex discipline, including a lot of fields. One of them is an architectural engineering. It is a discipline that deals with the technological aspects of buildings. They are the properties and behavior of building materials and their components, foundation design, structural analysis and design, construction management, and building operation. Besides architectural engineering deals with environmental system analysis and design. Every engineer knows an environmental system, which may account for 45—70% of a building's cost, includes heating, ventilating and air conditioning, illumination, building power system, plumbing and piping, storm drainage, building communications, acoustic, vertical and horizontal transportation, fire protection, alternate energy sources, heat recovery, and energy conservation. In addition, it is necessary to help protect everybody from unnecessary risk. That's why architectural engineers must know and be familiar with

the various building codes, plumbing, electrical and mechanical codes, and the Life Safety Code. The latter code is designed to require planning and construction techniques in buildings which will minimize possible hazards to the occupants.

2. Reading for specific information. Read the text again and answer the following questions to the text:

- What is the architectural engineering?
- May environmental system account for 45—70%?
- For what must architectural engineers be familiar with the various building codes?

3. Find and translate all the sentences containing the following words:

- to storm drainage
- the Life Safety Code
- to mobilize the resources
- civil engineering infrastructure
- to contain desirable interior environmental conditions

4. Read the text again and complete the following sentences:

- Environmental system, which may...
- The latter code is ...
- ... A discipline that deals with the...
- In addition, ...
- ...architectural engineering.

5. Read the following statements and say whether they are true or false. Correct the false statements:

- Environmental systems, with may account for 35-90% of a building's cost, don't include heating.

- A discipline that deals with the technological aspects of buildings, including the properties is an architectural engineering.
- The latter code is designed to require planning and construction technologies in buildings which will minimize possible hazards to the occupants.
- Including the properties and behavior of building materials and components, foundation design, structural analysis and design, environmental system analysis and design, construction management, and building operation.
- Engineering is a simple discipline.
- That's why architectural engineers must not know and be familiar with the various building codes,
- Every engineer does not know an environmental system.

After-Reading

Grammar focus

1. *Complete the following words from the text:*

ar _ itect_ral, eng_ne_r_ng, te _nolo__cal, te _ni_ue,
il _ min__ti_n, m_nag_me_t, p_bli_, min_mi_e, aco_sti_s, en __gy.

2. *Find all the sentences where the professional terminology is used, read and translate them. Write the professional terminology.*

3. *Write down all irregular verbs and their three forms.*

4. *Translate from Ukrainian into English:*

Архітектурна інженерія — дисципліна, яка має справу з технологічними аспектами будівель:

- 1) враховує властивості і поведінку будівельних матеріалів і їх компонентів,
- 2) проектує фонд підстави,
- 3) проводить структурний аналіз проекту

Get talking

1. Prepare reports about Great Ukrainian architects and engineers. A report should include 2000–3000 words.



TEXT № 8

BUILDING CONTRACTION

Before-reading

1. Discuss the following:

- Can you imagine Building Construction of the first men's houses?
- Do you know anything about the first building materials?
- What is your own point of view about the present state of building construction?

2. Try to guess the meaning of the following words. Use the dictionary if you need:

- functional
- human
- a wide variety of climates
- long periods
- ceremony
- symbolic
- history of building
- natural materials
- synthetic materials
- coordinate a work
- construction management
- quality control

3. Match the following words with their Ukrainian equivalents:

- building constructions
- construction progress
- quality control
- building materials
- synthetic materials
- a development of stronger materials
- construction management
- будівельні матеріали
- контроль якості
- розвиток міцних матеріалів
- будівельні конструкції
- будівельний прогрес
- будівельний менеджмент
- синтетичні матеріали

While-Reading

1. Read the text and find new words from the text.

2. Reading for general understanding. Skim read the text. Think of a good title for it. Compare it with other students' titles.

3. Read and translate the third paragraph from the text:

One of the ancient human activities *is* building construction. It began with a purely functional need for a controlled environment to moderate the effects of climate. Human shelters were constructed to adapt human beings to a wide variety of climates and become a global species. But temporary structures were used only a few days or months. Over time were they evolved into such a highly refined form as the igloo. After adventing agriculture, people began to stay in one place for long periods. That's why more durable structures began to appear. The first human shelters were very simple. The first shelters were dwellings. But later they were used for other functions, such as food storage and ceremony. Some structures began to have symbolic as well as functional value, marking- the beginning of the distinction between architecture and building.

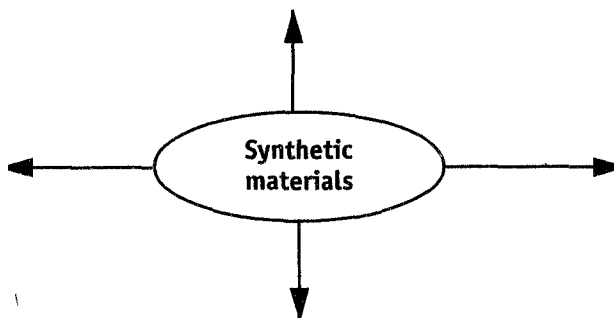
Building construction has its own history, which is marked by a number of trends. Let's describe some of them. One of these trends

is increasing durability of the materials. The first building materials were perishable. We mention leaves, branches and animal hides. Later people began to use more durable natural materials such as clay, stone, timber. Finally, synthetic materials such as bricks, concrete, metals, plastics were used in building. Another trend is quest for buildings of greater height and span. It was possible by the development of stronger building materials and by knowledge of how materials behave and how to exploit them to greater advantage. The third trend involves the degree of control exercised over the interior environment of buildings: increasingly precise regulation of air temperature, light and sound levels, humidity, air speed. All factors that affect human comfort become possible. A modern trend is change in energy of the construction progress, starting with human muscle power and developing toward the powerful machinery.

The present state of building construction is complex. There is a wide range of products and systems which are aimed primarily at groups of building types. We know about a great role of the design process for buildings. It draws upon research establishments that study material properties and performance, code officials. Last ones adopt and enforce safety standards and design professionals who determine user's needs and design a building to meet those needs. It proves that the design process for buildings is highly organized. The construction progress is also highly organized. It includes the manufacturers of building products and systems. On the building site craftsmen assemble themselves. A work of the craftsmen is employed and coordinated by contractors. There are also consultants who specialize in such aspects as construction management, quality control and insurance. We must mention about complexity and measure of mastery of natural forces, which can produce a widely varied built environment to serve the needs of society. In conclusion, modern building construction is a significant part of an industrial culture.

4. Read the text again and find the main idea of each paragraph.

5. Read the text once more and complete the spidergram.



6. Read the text again and complete the following sentences:

- One of these trends is the increasing...
- ...building construction...
- Human shelters were...
- ...is market by a number of trends.
- Over time temporary structures...

1. Read the following statements and say whether they are true or false. Correct the false statements:

- One of the ancient human activities is building construction.
- The present state of building construction is simple.
- In conclusion, modern building construction is a unimportant part of an industrial culture.
- Over time they evolved into such highly refined forms as the igloo.
- It draws upon research establishments that study clothes and performance, code officials.

After-Reading

Grammar focus

1. Write the words in the correct order to make sentences and translate them into Ukrainian:

- shelters, the, dwelling, first, were.
- building, is, of, culture, industrial, construction, significant, part, today.
- for, is, another, buildings, guest.
- gradually, began, durable, more, structures, began, to, appear.
- trend, degree, involves, the, a, major, third, degree, control, over, of, exercised, environment, the, interior, buildings, of.

2. Write down all the nouns from the text in plural.

3. Write down all irregular verbs and their three forms.

4. Find all the sentences from the text in the Passive Voice. Copy them in your exercise-books.

5. Complete the table (pay attention to degrees of comparison):

ancient		
industrial		
significant		
	greater	
global		
powerful		
functional		
synthetic		
	stronger	
natural		

Get talking

1. Give a summary of the text in 150 words.

2. Imagine you are a future skilled engineer. Say some words about "The present state of building construction". Your talk should last a minute.



TEXT № 9

ARCHITECTURAL DESIGN OF A BUILDING

Before Reading

1. Discuss the following:

- Why do we have to design a house in the building?
- What considerations will affect the design?
- What problem is met during the whole period of construction on the building site?

2. Match the words with their Ukrainian equivalents:

- | | |
|---|--|
| • orientation and surveying | • опора і фундамент |
| • soil | • каналізація |
| • transportation | • екстер'єр |
| • styling of a building | • проектування будівлі |
| • footing and foundation | • перевезення |
| • to erect | • розкопки |
| • excavation | • зв'язок і рівні каналізації і водовідведення |
| • sewerage line | • гранична висота |
| • exterior | • геодезична зйомка |
| • ceiling height | • ґрунт |
| • electric power line | • водостік |
| • location and levels of existing sewer and water mains | • споруджувати, споруджувати |
| • water supply line | • лінія електропередачі |

3. Make up your own sentences with the following words:

an exterior (екстер'єр), *to erect* (споруджувати), *an electric power line* (лінія електропередачі), *an excavation* (розкопки екскаватором), *a transportation* (транспортування).

While-Reading

1. End and translate all the sentences, containing the following words:

- sufficient depth
- exterior
- foundations
- water supply line
- transportation
- style
- soil

2. Reading for specific information. Read the text, choose a right word.

Orientation and surveying of the Building. Before beginning the (*construction, work*) of any building it is necessary to consider several (*problems, ideas*) closely connected with the lot where the (*building, monument*) is to be erected. Some of these problems are as follows:

Soil. (*Soil, land*) is a very important problem in the building of any house. The land may have a sufficient (*depth, high*) of rich top soil, but beneath may be a ledge of soil rock. In this way the excavation of the basement is very expensive, especially in climates where the footings must be carried down below the (*frost, rain, sun*) Une.

Transportation. The problem of (*transportation, soil*) is the most important during the whole period of (*construction, time*) on the building site. One must see whether there are sufficient means of erecting ways for bringing up the (*materials, people*) and men for a building site. One must also see if there is a sewerage line, water

supply line, (*gas, water*) line, electric power line. The most important thing is how all of them can be used.

Surveying. A survey is a piece of land's plan, showing its exact dimensions and (*level, range*) of existing sewer and water mains, electric light, gas services, etc.

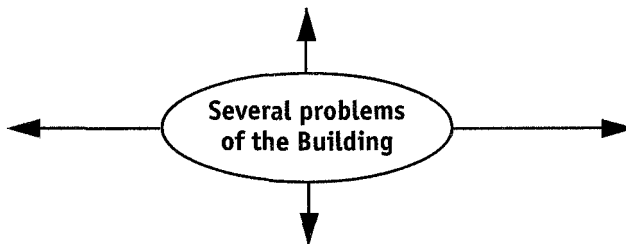
Styling of a building. When all the things have been carefully considered, another (*point, idea*) must be kept in mind. This is the "style" which the building is to be planned in. We mention its (*exterior, interior*). If we have to design a house, there is a number of practical considerations which will affect the (*design, picture*). Here are some of them: 1. Height of the first floor above ground. 2. Ceiling heights. The height of the ceiling is a matter to be determined by the designer.

Footing and foundations. Now we shall consider separate parts of a building, beginning with (*footing, style*) and foundations. The extra of the wall at the bottom can be obtained by making the wall thicker. It depends below the ground (*surface, level*).

3. Reading for specific information Read the text and answer the following questions to the text:

- Is soil a very important problem in the building?
- What are the functions of the foundations and walls?
- How does soil influence on the building of any house?
- What is surveying and styling of the building?
- Why may the excavation of the basement be very expensive?

4. Read the text again and complete the spidergram:



5. Read the following statements and say whether they are true or false. Correct the false statements:

- The transportation isn't problem during the whole period of construction on the building site.
- Before beginning the construction of any building you should to consider several problems which connected with the lot where the building is to be erected.
- The land may have a ledge of soH rock, which will make the excavation of the basement very easy.
- The land may have a sufficient depth of rich top soil.
- Exterior is the "style" which the building is to be planned in.

6. Read the text again and complete the following sentences:

- The height of the ceiling that is clear height from floor to ceiling is...
- Now we... with footing and foundations.
- ...is the most important during the whole period of construction on the building site.
- ...is a plan of a piece of land showing it's exact dimensions and levels.... electric light,...
- When all the things ...

After-Reading

Grammar Focus

1. Complete the following words from the text:

Or _ ntat _ n, so_l, ne_es_ary, tr_nsp ___ tation, fou_d_tion,
su_fi _ ent, bo_tom, _xcav_tion, _are_ul_y, desi ____ er, gr_und,
s _ fa_e, pr__cti_al, _on_ider_tion, s__ve_, d__men_ion.

2. Write all the following nouns in plural:

A construction, a building, water, a plan, a problem, a land, a style, a foundation, a wall, a level, a floor, soil, a man, a rock, a ceiling, thickness, a bottom, a line, gas, power.

3. End all the sentences from the text with the forms of the verb "to be". Copy them in your exercise-books.

4. Make the following sentences negative and put into the interrogative form:

- Soil is a very important problem in the building of any house.
- This is the "style" which the building is to be planned in, in other words, its exterior.
- -There is a number of practical considerations which will affect the design.
- Now we shall consider the separate parts of a building.
- Beneath may be a ledge of soil rock.

6. Translate from Ukrainian into English:

- Земля може мати достатню глибину родючого ґрунту, під шаром якої може бути шар скелястого ґрунту, що є причиною дорогих розкопок під підстави будівель.
- Проблема транспортування існує впродовж всього періоду будівництва.
- При будівництві необхідно враховувати, чи є каналізація, чи проведена вода, газ і електрика, і як можна їх використовувати.
- Оглядовий план ділянки землі показує точний розмір колектора і наявність води, світла і газу.
- Додаткова товщина стіни в підставі може бути досягнута за рахунок потовщення підстави.

Get talking

1. *Imagine you are a future skilled engineer. Give a summary of the text "Architectural Design of a Building" in 150 words.*

2. *Work in pairs. Discuss: a) Architectural Design of a Building. Your dialogue should include 20 phrases.*



TEXT № 10

FOUNDATION

Before-Reading

1. *Discuss the following:*

- What is a role of building's foundations?
- What do you think about the problems involved in laying building's foundations?

2. *Try to guess the meaning of the following words. Use the dictionary if you need:*

- builders
- building's foundations
- stable
- mechanics
- foundation engineer
- hollow concrete box
- ventilating plants

While-Reading

1. *Read the text and find new words from the text.*

2. *Find and translate all the sentences containing the following words:*

- a tall modern structure
- solid shafts

- building's foundations
- heating and ventilating plants
- weight of a building
- a separate solid block
- pouring in the concrete

3. Read the text again and translate it.

We have mentioned about some problems connected with building. One of them is a foundation. Architects and engineers are aware of the problems involved in laying building's foundations. They do not always realize to what extent the earth can be pressed down by the weight of a building. Too little allowance has sometimes been made for the possibility of a heavy structure's sinking unevenly. There are a lot of examples of foundations' problems. One of them is the Leaning Tower of Pisa. Why did the Leaning Tower of Pisa lean? The answer is that its foundations were not soundly laid. Though the Leaning Tower is 14 feet out of the perpendicular, it has never toppled. But there is a way out. As the building began to lean over, the builders altered the design of the tipper stories to balance it. At the same time as one side of it sank into the ground, the earth beneath was compressed until it became dense enough to prevent further movement.

That's why a foundation engineer has a lot of work. But in a tall modern structure the load may be very heavy indeed. IN this way the foundation engineer has an extremely important job to do. To begin with, he must have thorough understanding of soil mechanics, which entails a scientific study of the ground to see what load it can be without dangerous movement. WE know that trial pits, holes can be. So the engineer must collect undisturbed samples of earth from various depths. By examining this, the engineer can forecast the probable shifts in the earth during and after building, according to the sort of the foundation he designs. Thus he comes to the most important decision of all in the building's

construction. He decides whether the earth is a type that can best support each column on a separate solid block, or whether he must aim at lightness.

It is important for the foundation engineer to know about different types of the ground. If it is a firm ground at great depth, the foundation engineer may use piles. These are solid shafts made either by driving reinforced, concrete deep into the ground, or by boring holes in the earth and pouring in the concrete. Each pile supports its load in one, or two ways. It may serve as a column with its foot driven into solid earth. At the same time it *may* stand firm because friction along its sides "grips" the column and prevents it from sinking.

But it may be a question of building's floating. In this way the foundations take the form of a vast, hollow concrete box. This box is divided into chambers. These ones will be house heating and ventilating plants as well as provide garage and storage space for the building.

The situations may be different. There are no problems at all or few of them. It can be if the earth is stable. Buildings stand on hard rock like granite or ironstone. For them neither piles nor need flotation be used. It is the best time for those foundation engineers whose buildings stand on the foundations possessing few problems.

4. Reading for specific information. Read the text and answer the following questions:

- What has been done to prevent the Leaning Tower of Pisa from toppling down?
- What is the most important for the foundation that an engineer must know?
- What must engineer learn before deciding what type of foundation is necessary for that soil?
- What types of foundations are mentioned in the article?

5. Read the text again and find the main idea of each paragraph.

6. Read the following statements and say whether they are true or false. Correct the false statements:

- For them neither piles nor need flotation be used.
- These are solid shafts made either only by driving reinforced.
- This box is divided into chambers.
- Architects and engineers are aware of the problems involved in laying a building's foundations.
- If firm ground has been found only at great depth, the foundation engineer may use piles.
- If the earth is stable, laying the foundations of small buildings possess few problems.
- Each pile supports its load in three ways.

After-Reading

Grammar Focus

1. Write down all the nouns from the text in plural.

2. Complete the table (pay attention to degrees of comparison):

		the earliest
heavy		
stable		
little		
small		
tall		
modern		
scientific		
		the most important
dangerous		

3. Make the following sentences negative and put into the interrogative form:

- Architects and engineers have been aware of the problems involved in laying a building's foundations.
- These are solid shafts.
- This box is divided into chambers.
- He must have thorough understanding of soil mechanics.
- We know that trial pits, holes can be.
- The engineer can forecast the probable shifts in the earth during and after building.

4. Write the following words in the correct order to make sentences and translate them into Ukrainian:

- Construction, the, he, all, to, of, most, comes, in, decision, the, building's, important.
- May, foundation, use, the, piles, engineer.
- Were, laid, foundations, soundly, not.
- The, if, stable, is, earth.
- Its, in, load, each, supports, one, both, two, or, pile, ways, of.

5. Write down all irregular verbs and their three forms.

Get talking

1. Work in pairs. Discuss "The problems involved in laying a building's foundations". Your talk should last a minute.

2. Imagine you are a future skilled engineer. Give a summary of the text "Foundation" in 150 words.



TEXT №11

THE GRAVITATIONAL FORCE

Before-Reading

1. *Discuss the following:*

- What types of natural forces do you know?
- How can you explain a "factor of safety"?

2. *Try to guess the meaning of the following words. Use the dictionary if you need:*

- gravitational force on a structure
- variable and movable
- magnitude of all the forces
- strength of the structure
- "safety factor"

While-Reading

1. *Reading for general understanding. Skim read the text. Think of a good title for it. Compare it with other students' titles.*

2. *Reading for specific information. Read the text, choose a right word.*

There are different forces influencing on building. One of them is a gravitational force. The gravitational (*force, power*) on a

structure can be divided into dead loads and live loads. It is important for engineers to know about dead loads and live loads. Dead loads can be calculated accurately because they rarely change with time and are usually fixed in one (*place, way*). Live loads are always variable and movable, so no exact (*figures, plans*) can be calculated for these forces. Structures must also resist other types of forces, such as (*wind, water*) or earthquakes, which are extremely variable. It is impossible to predict accurately the (*magnitude, engineer*) of all the forces that act on a structure during its life. We can only predict from past experience the probable magnitude and frequency of the loads.

All this information must be used in building. (*Engineers, workers*) never design a structure so that the applied loads exactly equal the (*strength, length*) of the structure. This (*condition, idea*) is too dangerous because we can never know the exact value of the applied loads or the strength of the structure. All engineers must not forget about a "factor of safety". The "safety factor" is defined as the (*ratio, problem*) of the probable strength of the structure and the probable loads on the structure. This (*factor, place*) may range from 1 (where there is little uncertainty) to perhaps 5 or 10 (where there is great uncertainty).

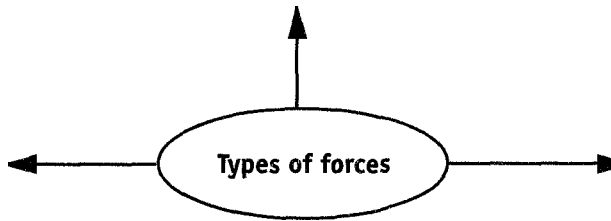
3. Read the text again and translate it.

4. Reading for general understanding. Read the text and answer the following questions to the text:

- Can the loads from the internal partitions of a building be estimated accurately? Why?
- Can the loads from storage in a building be estimated accurately? Why not?
- How can an engineer predict the possible loads that will occur on a structure?
- Why do engineers never design a structure so that the applied loads exactly equal the strength of the structure?

- When is there great uncertainty about the loads on a structure and the strength of a structure?
- Does an engineer choose a high or low safety factor?
- When does failure occur?

5. Read the text again and complete the spidergram:



6. Read the text once more and match the parts of the sentences:

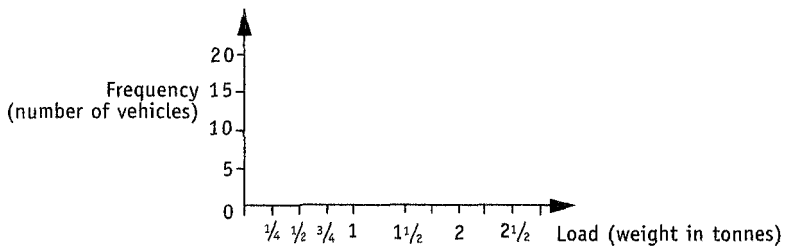
- | | |
|--|--|
| • The gravitational force on a structure | • are always variable and movable. |
| • Live loads | • other types of forces such as wind or earthquakes. |
| • Dead loads | • can be divided into dead loads and live loads. |
| • Structure must also resist | • is defined as the ratio of the probable strength of the structure and the probable loads on the structure. |
| • The safety factor | • can be calculated accurately. |

After-Reading

1. Read the text and copy the diagram at the top of page and use the results to make a bar chart.

A survey was made of the weights of 74 vehicles passing over a bridge. The results of the survey were recorded as follows:

Weight in tonnes	Number of vehicles
0 to $\frac{1}{4}$	1
$\frac{1}{4}$ to $\frac{1}{2}$	3
$\frac{1}{2}$ to $\frac{3}{4}$	7
$\frac{3}{4}$ to 1	15
1 to $1\frac{1}{4}$	20
$1\frac{1}{4}$ to $1\frac{1}{2}$	13
$1\frac{1}{2}$ to $1\frac{3}{4}$	8
$1\frac{3}{4}$ to 2	4
2 to $2\frac{1}{4}$	2
$2\frac{1}{4}$ to $2\frac{1}{2}$	1



2. Read the previous text again and complete the sentences, predicting average future loads from vehicles on the bridge:

- It is that the load will be less than 0 tonnes.
- That the load will be 0-3 tonnes.

- It is that the load will exceed 2 tones.
- The most frequent load on the bridge will probably be between and tones.

3. Read and copy the diagram in exercise 2 again and use these results to make another bar chart.

74 identical structural components were tested for tensile strength. The results were as follows:

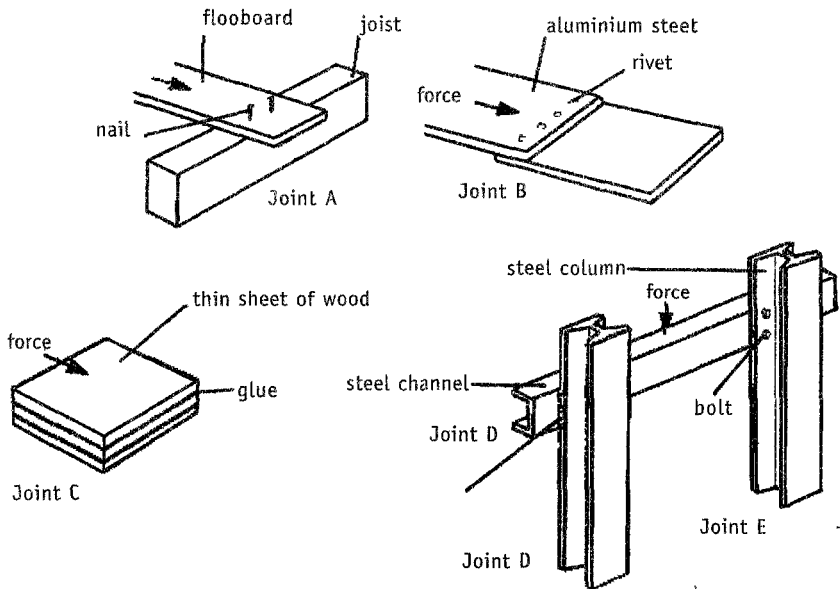
Tensile strength at Failure in tones	Number of components
$1 \frac{1}{4}$ to $1 \frac{1}{2}$	4
$1 \frac{1}{2}$ to $1 \frac{3}{4}$	18
$1 \frac{3}{4}$ to 2	30
2 to $2 \frac{1}{4}$	18
$2 \frac{1}{4}$ to $2 \frac{1}{2}$	4

4. Read the statements and say whether they are true or false. Correct the false statements:

- Most of the components failed at a load between $1 \frac{1}{2}$ and $1 \frac{1}{4}$ tones.
- No components failed below a load of $1 \frac{1}{4}$ tones.
- Nearly all the components failed above a load of $1 \frac{1}{2}$ tones.
- Very few components failed over a lewd of $2 \frac{1}{2}$ tones.
- If these components are used in a bridge which is loaded to destruction, they will probably fail at a load between 2 and $2 \frac{1}{4}$ tones.

5. Look at these diagrams of joints and answer these questions:

- For each joint, say how the units are joined together.
- Explain how forces are transmitted through each joint.
- In which joints can packing be used?
- In which joints should the joint surfaces be machined flat?



Grammar focus

1. Write down all the nouns from the text in plural.

2. Match nouns and adjectives:

- | | |
|---------|---------------|
| • force | "live" |
| • loads | exact |
| • loads | gravitational |
| • value | applied |
| • loads | "dead" |
| • loads | probable |

3. Make the following sentences negative and put into the interrogative form:

- The gravitational force on a structure can be divided into dead loads and live loads.

- Live loads are always variable and movable.
- This condition is too dangerous.
- Structures must also resist wind or earthquakes.
- It is impossible to predict accurately the magnitude of all the forces that act on a structure during its life.

4. Find all the sentences with modal verbs, translate them. Copy them in your note-books.

5. Find all the sentences from the text in the Passive Voice. Copy them in your exercise-books.

Get talking

1 Discuss the possibility of catastrophes occurring in your country and their likely effects. Example: A major earthquake will probably occur in Japan during the next six months. There is a very slight possibility that a major earthquake will occur in Australia during the next twelve months. The ((possibility) or (likelihood)) that a major earthquake will occur in Great Britain in the near future is low. The chances that a major earthquake will occur in Peru in the next five years are high.



TEXT № 12

FRAME

S Before-Reading

1. Discuss the following:

- What is a role of frames in building?
- How many frames can a single-storey structure consist of?
Try to prove your own opinion.

2. Try to guess the meaning of the following words. Use the dictionary if you need:

- single-storey structure
- sheet steel cladding
- steel angles
- brick walls
- beams

While-Reading

1. Read the text and find new words from the text.

**2. Reading for general understanding. Skim read the text.
Think of a good title for it.**

Compare it with other students' titles.

3. Reading for specific information. Read the text, choose a right word.

There are different kinds of a structure. They are big, small, simple and with different details. First of all any engineer must know about any single-storey structure. The single-storey (*structure, building*) consists of three frames. The (*frames, doors*) are placed between end walls and spaced at 3 meter centers. These frames are made up of steel stanchions and beams. The (*stanchions, walls*) carry the beams. These beams support the (*roof, ceiling*). The roof (*beams, frames*) cantilever a short distance beyond the stanchions. This means that they extend over the profiled sheet steel cladding. (*cladding, work*) can then be placed outside the line of the stanchions. The beams are bolted to steel stanchion caps. The stanchion (*caps, frames*) are welded to the top of each stanchion. The (*load, roof*) on each beam is transmitted through these plates to the stanchions. The upper face of the (*steel, iron*) base plates and the ends of the stanchions are machined flat. The (*bottom, top*) of each stanchion is welded to a base plate. Each base (*plate, frame*) is fixed to a concrete column base by two holding-down bolts. Steel angles are fixed across the ends of the beams and built into (*the brick, leaf*) walls. These (*angles, caps*) tie the frames together and also provide a place to fix the top of the cladding.

4. Read the text again and complete the sentences:

- ...are machined flat.
- Steel angles...
- ... consists of three frames.
- ...is transmitted through these plates...
- ...a short distance beyond the stanchions.

After-Reading

Grammar focus

1. Complete the following words from the text:

S_n_le-stor_y, str_ct_e , st_n__ion, b_am, m_ter, _en_er,
r__f, d_st_nce, _la_ding, _pper, ma__ine, _on_rete, col_mn,
_ngle.

2. Choose the correct words in these sentences:

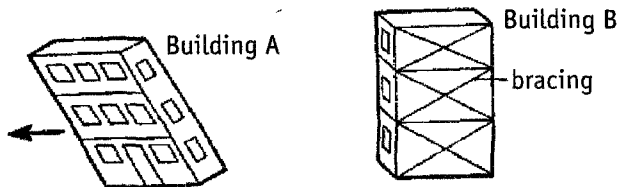
- A flood *may/might/will* probably cover large areas of ground in Australia sometimes during the next ten years.
- Hurricane *might/may/will not* kill several people in Japan before the end of the year.
- The possibility that a flood will damage crops in India sometimes during the next year is *high/low/non-existent*.
- There is no/*slight/strong* possibility that a hurricane will destroy several buildings in Peru sometimes during the next ten years.
- The likelihood of an earthquake causing a breakdown in power supplies in Florida is *low/non-existent/high*.

3. Find all the sentences from the text in the Passive Voice. Copy them in your exercise-books.

4. Write down all irregular verbs and their three forms.

Get talking

1. Read the text "Houses in Japan after an earthquake" and make the following generalization:



Architects looking at buildings in Japan after an earthquake, observe that Building A has collapsed because the structural frame was not braced to resist the force of the earthquake. From this observation we can make the following generalization:

Example: Buildings ((tend to) or (are likely to)) collapse during an earthquake if their structural frames are not braced to resist the force of earthquakes.

2. Look at this table about other hazards:

a) *What observations do you think you could make about buildings in the above countries?*

Example: During a hailstorm in Iran, the roof of a light structure was penetrated because the roof covering had not been made hail resistant.

b) *What generalizations can you make?*

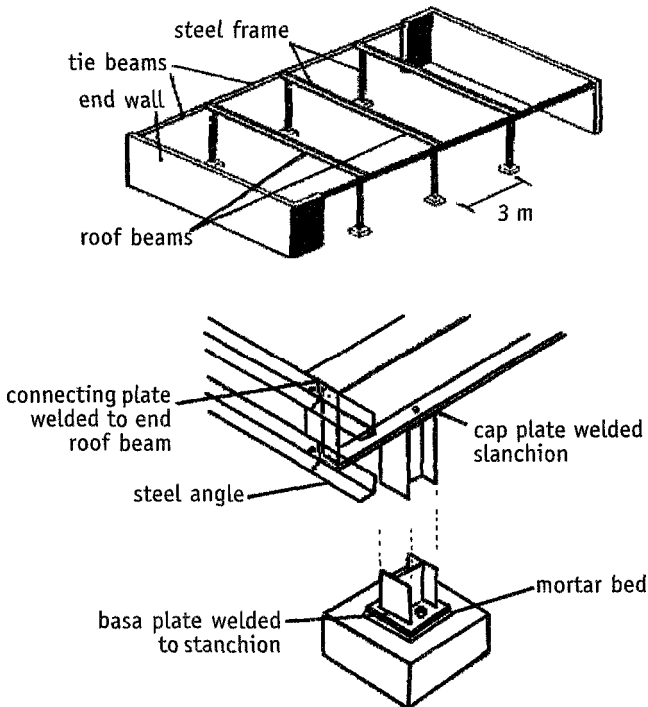
Example: Roofs of light structures in Iran are likely to be penetrated during a hailstorm if they are not hail resistant.

	Country	Hazard	Possible effect	Precautions taken
a)	Iran	Hailstorm	penetrate the roof of a light structure	make roof covering hail resistant
b)	All countries	thunderstorm	cause structural damage to tall buildings	fit a lightning conductor

	Country	Hazard	Possible effect	Precautions taken
c)	Hot-dry countries	sandstorm	damage exterior surfaces of a building	stop by erecting barrier screens a few metres from the building
d)	Africa	attack by termites	destroy the wooden components of a building	treat wood with preservatives
e)	All countries	fire	cause structural damage to buildings	use fireproof materials

3. Look at the following diagram showing the layout of frames the span of beams is 9 meters and make the following generalization:

Example: The frames are spaced at 3 meter centers.



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