МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ЗАПОРІЗЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ

Л. В. Мосієвич

ПРОФЕСІЙНО-ОРІЄНТОВАНИЙ ПРАКТИКУМ ІНОЗЕМНОЮ МОВОЮ

Навчально-методичний посібник для здобувачів ступеня вищої освіти магістра

спеціальності «Будівництво та цивільна інженерія»

освітньо-професійної програми «Промислове і цивільне будівництво»

Затверджено
вченою радою ЗНУ
Протокол №

Запоріжжя
2025

УДК 811.111'276.6:624(076.5)
М818

Мосієвич Л. В. Професійно-орієнтований практикум іноземною мовою : навчально-методичний посібник для здобувачів ступеня вищої освіти магістра спеціальності «Будівництво та цивільна інженерія», освітньо-професійної програми «Промислове і цивільне будівництво». Запоріжжя : Запорізький національний університет, 2025. 136 с.

Навчально-методичний посібник призначений для здобувачів ступеня вищої освіти магістра спеціальності «Будівництво та цивільна інженерія» освітньо-професійної програми «Промислове і цивільне будівництво» для використання під час аудиторних занять.

Основною метою видання є формування англомовної професійно-комунікативної компетенції. До змісту включено теми, спрямовані на формування комунікативної компетенції в читанні та говорінні, розвиток умінь писемного мовлення, збагачення термінологічного словникового запасу.

У посібнику подано в систематизованому вигляді програмний матеріал дисципліни «Професійно-орієнтований практикум іноземною мовою». У виданні представлено теоретичний та практичний матеріал з 14 тем, об'єднаних у 4 розділи: Fundamentals of professional communication, Academic communication, Construction materials, Innovative construction technologies. Структура розділів уніфікована і включає теоретичний матеріал, автентичні тексти професійно-навчальної спрямованості, комплекс мовних і мовленнєвих вправ та завдання, що сприятимуть розширенню активного тематичного словника й формуванню комунікативних умінь писемного та усного мовлення.

Видання спрямоване на формування у майбутніх будівельників практичних навичок володіння англійською мовою в обсязі, необхідному для роботи з науковою літературою за фахом; навичок усного спілкування в професійній сфері в контексті окресленої тематики.

Рецензент
В. Л. Вертегел, кандидат педагогічних наук, доцент кафедри викладання другої іноземної мови, доцент

Відповідальний за випуск
С. В. Іваненко, завідувач кафедри іноземних мов професійного спрямування

ЗМІСТ

ВСТУП

Відповідно силабусу дисципліни «Професійно-орієнтований практикум іноземною мовою » є обов'язковою дисципліною у навчальному плані підготовки здобувачів ступеня вищої освіти магістра спеціальності «Будівництво та цивільна інженерія» освітньо-професійної програми «Промислове і цивільне будівництво» для студентів першого року навчання. Основним *завданням* курсу є формування навичок ефективної комунікації англійською мовою в академічному, науковому, професійному середовищі.

У результаті вивчення навчальної дисципліни студент повинен набути таких результатів навчання (знання, уміння тощо) та компетентностей: *загальні компетентності* (здатність здійснювати та аналізувати інформацію з різних джерел; здатність використовувати іноземну мову для здійснення науково-технічної діяльності); *спеціальні компетентності* (здатність презентувати результати науково-дослідницької діяльності, готувати наукові публікації, брати участь у науковій дискусії на наукових конференціях, симпозіумах тощо); *програмні результати навчання* (застосовувати спеціалізовані концептуальні знання, що включають сучасні наукові здобутки, а також критичне осмислення сучасних проблем в галузі будівництва та цивільної інженерії для розв'язування складних задач професійної діяльності; вільно спілкуватися іноземними мовами усно і письмово для обговорення професійних проблем і результатів діяльності у сфері архітектури та будівництва, збирати необхідну інформацію, використовуючи науково-технічну літературу, бази даних та інші джерела, аналізувати і оцінювати її).

Для досягнення компетентностей студент повинен **знати:**

- базову фахову термінологію іноземною мовою;
- основні фахові міжнародні видання та науково-метричні бази даних із галузі будівництва;
- можливості використання їх інформативного потенціалу для проведення досліджень;
- правила складання наукових статей, анотацій, доповідей іноземною мовою;
- правила складання CV іноземною мовою;

уміти:

- володіти й вільно оперувати фаховою англомовною термінологією;
- користуватися сучасними міжнародними академічними виданнями т а спеціалізованими науково-метричними базами даних із галузі будівництва;
- користуватися сучасними спеціалізованими словниками з різних галузей науки і техніки;
- володіти електронними засобами перекладу як у режимі on-line, так і спеціалізованими програмними продуктами (Lingvo тощо);
- писати наукові статті іноземною мовою;
- складати особисте резюме та CV;
- складати анотації до кваліфікаційних робіт та наукових статей іноземною мовою;

- розробляти презентації до доповідей і виступити на науковій конференції;
- розуміти професійні і етичні стандарти діяльності, застосовувати їх під час діяльності у бідивництві.

У виданні представлено теоретичний та практичний матеріал з 14 уроків, об'єднаних у 4 розділи: Fundamentals of professional communication, Academic communication, Construction materials, Innovative construction technologies. Тексти висвітлюють загальні та сучасні питання будівельної галузі. Структура кожного уроку уніфікована і включає:

- теоретичний матеріал (що висвітлює проблеми науково-технічного перекладу, бізнес комунікації, складання технічної документації, граматичних труднощів технічних текстів, написання наукових статей, анотацій, створення презентацій. Після кожного теоретичного блоку студентам пропонуються питання для самоперевірки у тестовому форматі;
- практичний матеріал, мета якого полягає в опрацюванні теоретичних знань. Практичні завдання спрямовані на активізацію певного лексичного, граматичного матеріалу та розвиток іншомовної професійної компетентності у говорінні та письмі.

Поєднання теоретичного та практичного матеріалу уможливлює працювати як індивідуально, так і самостійно.

Використання технології скаффолдингу (методики підтримуючої дії) сприяє ефективному вивченню англійської мови студентами немовних спеціальностей. Посібник надає вичерпні пояснення та ілюстративні приклади для кращого розуміння матеріалу та виконання завдань. Крім того, він містить чіткі алгоритми для послідовного виконання завдань, допомагаючи студентам систематизувати свої знання та навички.

Також, студентам запропоновано приклад підсумкового тесту з дисципліни, який є зразком залікового тесту на платформі Moodle. Тест акумулює знання і навички з вивченої дисципліни.

В якості додатка до видання включено англо-український словник будівельних термінів, необхідних для розуміння текстів видання. Окрім того, додаток містить список наукових кліше для написання анотацій до фахових статей та власне статей. Викладення матеріалу ґрунтується на принципах методики CLIL.

CHAPTER 1. FUNDAMENTALS OF PROFESSIONAL COMMUNICATION
UNIT 1. CAREER

THEORETICAL PART
FUNDAMENTALS OF TECHNICAL TRANSLATION

Read and check your understanding.

A technical translation is a type of translation that involves the translation of technical content from one language to another. Technical content includes documents, manuals, instructions, patents, software, and other technical materials that require specialized knowledge in the subject matter.

Accuracy is crucial in technical translations, as even a small error can have serious consequences in technical fields such as engineering, medicine, and law.

While quality and accuracy are always a priority in any translation project, they take on an even greater role when it comes to technical translations. This is because small inaccuracies can have serious consequences: fines, lawsuits, public embarrassment, or even patent rejection – with the subsequent inability of the company to continue operating in that market.

In other words, with technical translation, compliance and corporate responsibility are tightly linked to the quality of the technical translations that the company produces. Every specialty in technical translation has its own prerequisites and specialized terminology and requires a highly qualified, experienced team of linguists who are familiar with the field.

In the case of intellectual property rights (IPR) – which includes patents, copyrights, trademarks, trade secrets, licensing, and unfair competition – for example, translators need to master a very specific and highly regulated language. They also require interdisciplinary knowledge since they have to be familiar with aspects of technology, business, economy, and law.

Technical translation involves translating technical documents, such as user manuals, technical reports, and instruction manuals. These documents often contain highly technical and specialized terminology that requires an in-depth understanding of the subject matter. As such, technical translators are often highly skilled and specialized professionals with expertise in a particular field.

The use of technical translation in technical education has numerous benefits. It helps students access information previously unavailable to them due to language barriers. This, in turn, increases the quality and relevance of the education they receive, making them better prepared for the global workforce.

Requirements for technical translation:

Accuracy: Technical translation requires precision and accuracy to ensure the translated document conveys the same meaning as the source text. Technical translations must be reliable and trustworthy, as any translation error could lead to misunderstandings, errors, or accidents.

Quality: Technical translation requires specialized knowledge, vocabulary, and experience. A professional technical translator is trained to understand the nuances of technical language and can provide accurate and high-quality translations.

Speed: Technical translation projects are time-sensitive and require a quick turnaround. A professional translator with technical expertise can work efficiently to deliver translations promptly.
Compliance: Technical translation projects require compliance with industry standards, regulations, and legal requirements. A professional translator with technical expertise can ensure compliance with all relevant standards and regulations.

ChatGPT for technical translation.

ChatGPT is a general-purpose online language model that is not only designed for machine translation. Although the developers of ChatGPT claim that this technology can be particularly useful in industries where accuracy and precision are critical elements, there is still doubt about its efficacy. Industries that are highly regulated, such as the medicine and law industry uses complex terminology and content. They must also adhere to strict formatting guidelines. As the guidelines can vary globally, it can cause changes in the entire layout of the content. As a result, the content often needs extensive adaptation to suit foreign audiences and markets.

This is the reason why translations of highly regulated industries are challenging to get right. ChatGPT may be a powerful AI tool but it does not have the capacity and knowledge to make all the required adaptations. Additionally, the stakes for these highly regulated industries are high, as any mistake can possibly have legal and financial repercussions. Perhaps this is why it is suitable to trust professional translators for these industries instead of relying on the ChatGPT tool.

ChatGPT is an online tool that has wide uses in terms of delivering accurate and efficient results. While it can have huge benefits for certain industries such as technology, its efficacy may be questionable for the translation industry. Although speedy translations are easier to obtain with the help of ChatGPT, these translations may lack context. Nevertheless, with the combination of both human translation and ChatGPT, it can be ensured that the translations are accurate and professional.

Construction terminology.

English construction terminology has several distinct characteristics shaped by the industry's practical nature, need for precision, and global influence. Here are the key peculiarities:

1. Prevalence of Compound Terms

Structure: Many terms are compound nouns formed by combining two or more words (e.g., *load-bearing wall*, *reinforced concrete*, *shear force*).

Challenges: These terms often lack prepositions, making their structure concise but sometimes ambiguous.

2. Use of Abbreviations and Acronyms

Common abbreviations include *RC* (Reinforced Concrete), *MEP* (Mechanical, Electrical, and Plumbing), and *BIM* (Building Information Modeling). These save space in technical documents but may require clarification for non-specialists.

3. Technical Precision

Construction terms must be accurate and descriptive to prevent misinterpretation (e.g., *dead load* vs. *live load*). Specialized terms like *pile cap*, *formwork*, and *lintel* are used to describe specific elements of construction.

4. Borrowings and International Influence

English borrows terms from other languages due to globalization (e.g., *façade* from French, *caisson* from Latin). This makes terminology rich but sometimes inconsistent across regions.

5. Tendency for Nominalization

Many construction terms are nouns derived from verbs or adjectives (e.g., *reinforcement* from *reinforce*, *insulation* from *insulate*).

6. Semantic Specificity

Words often have highly specific meanings within the construction context (e.g., *joint* in construction refers to a connection between building materials, not anatomy).

7. Use of Standards and Codes

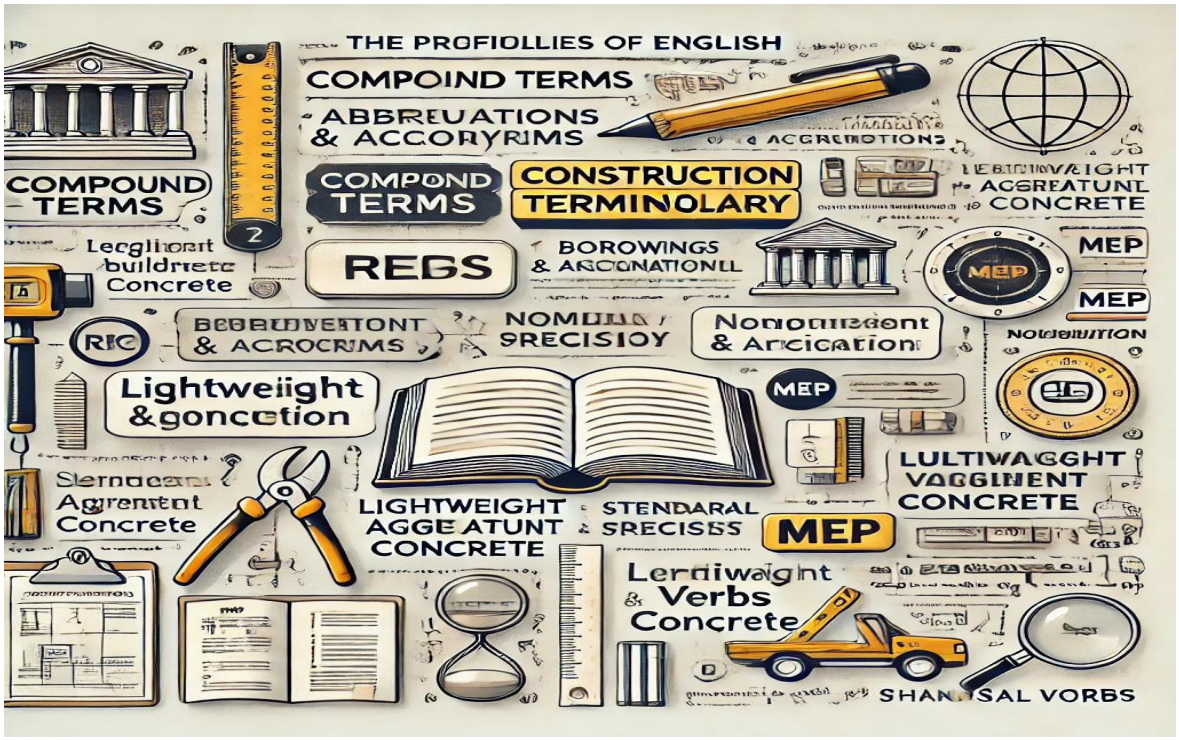
Construction terminology often aligns with standards like ISO, ASTM, or Eurocodes. Terminology can vary between British and American standards (*formwork* in British English vs. *shuttering* in American English).

8. Use of Multicomponent Terms

Construction terms often include multiple components that indicate relationships or specifications (e.g., *lightweight aggregate concrete*, *post-tensioned slab*).

9. Inclusion of Phrasal Verbs and Idiomatic Expressions

Practical construction language frequently uses phrasal verbs (e.g., *set up scaffolding, lay down tiles*).



SELF-ASSESSMENT

1) What is technical translation?
   a) Translating technical documents from one language to another
   b) Translating literary works from one language to another
   c) Translating legal documents from one language to another
2) What are some of the challenges of technical translation?
   a) Understanding technical terms and concepts in the source language
   b) Finding the equivalent technical terms in the target language
   c) Maintaining consistency of terminology throughout the translation
3) What is localization in technical translation?
   a) Adapting a product or service to a specific locale or target market
   b) Translating technical documents for a specific industry
   c) Providing on-site interpretation services for technical conferences
4) Which of the following industries require technical translation?
   a) Medical and pharmaceutical
   b) Information technology
   c) Legal and financial
5) Which of the following translation tools can be used for technical translation?
   a) Translation memory software
   b) Machine translation software
   c) Terminology management tools
6) What is a technical glossary?
   a) A list of technical terms and their definitions
   b) A glossary of common phrases in a language
   c) A list of idioms and colloquial expressions in a language
7) What is a style guide in technical translation?

a) A set of rules for writing and formatting technical documents
b) A guide to translation quality assurance and best practices
c) A guide to using specific translation tools and software

8) What is the role of a technical translator?
a) Translating technical documents accurately and effectively
b) Understanding technical terms and concepts in the source language
c) Maintaining consistency of terminology throughout the translation

9) Which of the following factors can affect the quality of a technical translation?
a) The qualifications and experience of the translator
b) The use of appropriate translation tools and software
c) The amount of time and resources allocated for the translation project

10) What is back translation in technical translation?
a) Translating a document from the target language back to the source language
b) Translating a document multiple times using different translators
c) Checking the accuracy and consistency of a translation by having it translated back to the source language.

PRACTICAL PART

I.Preparation

Before reading study the following vocabulary:

employee/employer
a full-time/part-time job
job interview
to apply for a job
vacancy

to fire somebody, to sack somebody
to give somebody notice
unemployment
flexible timetable
salary
to work in shifts
to work overtime

II. Reading Text

Strategies to Build a Successful Career

Having a successful career will offer you a lot of benefits and real profitable opportunities. As we live in a world governed by social status and money, working your way up to the top will definitely improve your quality of life. There are many possible reasons for which an individual would desire success.

1. Identify Your Goals

You need to identify what are your biggest rational wishes. Then, start going deeper and make an in-depth introspection in which you should think about the connection between your inner desires and your rational goals.

They have to match. Otherwise, you will not be truly fulfilled with your professional life. Identifying your goals takes some time and effort, but it is a truly important process in any successful person's journey.

2. Build a Professional Resume

By taking care of this aspect, you are making sure that you'll never be caught off guard. Opportunities are everywhere, and you should always be ready with a quality resume. I believe that letting professionals deal with your resume is a productive choice.

3. Become Aware of Your Strengths

Awareness is an essential key to personal improvement. By being aware of your inner thoughts, your strengths, your desires, and your disadvantages, you can adapt your life to whatever conditions you' re being put through. You'll also get many benefits as you can leverage your knowledge and wisdom for the best purposes.

No matter your strengths and disadvantages, you should choose a career path that advantages your traits and qualities.

4. Assume Full Responsibility for Your Life

One difference between mediocre and successful professionals: responsibility. Even though you know the concept, you may not apply it every day. Whenever something bad happens, you need to assume it.

Start assuming responsibility for all of your actions and never blame anyone for your mistakes. That's the worst thing someone can do. Do not take things personally, and be calm.

5. Always Raise Your Standards

Here's another critical factor that differentiates the successful from the non-successful. Your standards influence the way you think, believe, and behave. If your standards are high, you'll never be satisfied with less than you can accomplish. People with high standards are most of the time more successful than the average.

Every two or three months take a moment to reflect upon your standards and values. Try to improve them bit by bit up until you realize that you've become the best version of yourself.

6. Brand Yourself

Branding is very important nowadays. Big companies are spending hundreds of millions in order to establish themselves as the "big dogs" in the marketplace. It is an old business strategy used by almost every professional company. Your branding is your image in the marketplace.

Professional employees should brand their names and services and constantly improve it. You can do that by starting a blog, creating a professional social media profile, or simply by providing awesome services.

7. Network -- A LOT

Networking is all about opportunities and connections. When you meet new people, you basically get a chance to use their skills to your advantage. Of course, you must also give back something: your services, your knowledge, your money.

Successful people always network and create those life-lasting profitable relationships.

Start by creating social media profiles on LinkedIn, Twitter, and Facebook. These three specific networks are the best choices when it comes to this type of activity.

✍ After-reading tasks

1. Insert the appropriate word or word combination from Vocabulary:

There are as many kinds of careers as there are people. They vary greatly in the type of work involved and in the ways they (1) _____ a person's life.

The kind of career you have can (2) _____ your life in many ways. For example, it can (3) _____ where you live and the friends you make. It can reflect how much education you have and can determine the (4) _____ of money you earn. Your career can also affect the way you feel about yourself and the way other people act toward you. By making wise decisions (5) _____ your career, you can help yourself build the life you want.

To make wise career decisions and plans, you need as much information as possible. The more you know about yourself and career (6) _____, the better able you will be to choose a (7) _____ career.

Learning about oneself. People differ in what they want from a career. Many people desire a high income. Some hope for fame. Others want (8) _____. Still others want to serve people and make the world a better place.

Before you begin to (9) _____ career fields, you should determine (a) your values; (b) your interests; and (c) your aptitudes (abilities). Most people are happiest in jobs that (10) _____ their values, interests, and aptitudes.

Each person has many values, which vary in strength. For example, money is the strongest value for some people — that is, wealth is more important to them than anything else. As a result, they (11) _____ their thoughts, behaviour, and emotions on the goal of earning a high income. Other values include devotion to religion, taking risks, spending time with family, and helping others. People should understand their values prior to making a career decision. You can develop an understanding of your values by asking yourself what is most important to you and by examining your beliefs. For example, is it important to you to work as a member of a team? Or would you rather be in charge or work alone? If working alone or being in charge is important to you, independence is probably one of your (12) _____ values.

	A	**B**	**C**	**D**
1	move	influence	persuade	guide
2	move	interest	disturb	affect
3	control	choose	determine	discover

4	amount	mass	volume	supply
5	in relevant to	concernin g	respect	in a case
6	hours	moments	occasions	opportuni ties
7	satisfying	delightful	comfortab le	suitable
8	accident	experienc e	adventure	incident
9	research	examine	inspect	explore
10	fit	agree	change	belong
11	move	meet	focus	follow
12	best	primary	elementar y	primitive

2. Answer the questions:

1) Do you agree with all strategies for building a successful career?
2) What categories of people are a part-time job suitable for?
3) Is the unemployment level high in Ukraine?
4) What steps should you take to apply for a job?
5) Why is it difficult/easy to run a firm?
6) What are the most important criteria for a successful job?

3. Quiz:

1. Abilities relating to dealing with persons on the job
   a) Interpersonal
   b) Teamwork skills
   c) Networking
   d) Punctuality
2. A meeting between an employer and a job applicant
   a) board meeting
   b) interview
   c) on the job training
   d) negotiation
3. A person working for someone else
   a) employer
   b) employee
   c) co-worker

d) trainee

4. A form in which you supply information about yourself that will help an employer make a hiring decision
   a) References
   b) Summary
   c) CV
5. Someone who hires another person
   a) Employee
   b) Employer
   c) HR
   d) Job personnel
6. Making use of all your personal connections to achieve your career goals
   a) Teamwork
   b) Collaboration
   c) Negotiation
   d) Promotion
7. People who know an applicant well and can provide information about that person professionally
   a) Parents
   b) References
   c) Acquaintances
   d) Colleagues
8. Someone who applies for a job
   a) Candidate
   b) Applicant
   c) Employee
   d) Job seeker
9. Being able to easily accept new challenges
   a) Flexible
   b) Integrity
   c) Creativity
   d) Aptitude
10. An arrangement in which someone learns an art, trade, or job under another
   a) Courses
   b) apprenticeship
   c) training
   d) negotiation

4. Discussing the topic "Job satisfaction"

Work in pairs or groups. Arrange "job satisfaction features" in the order of importance. Make use of the relevant features and appropriate expressions for discussion:

Being able to learn new things
Earning plenty of money

Being part of a team
Meeting people through work
Having pleasant colleagues
Being praised by my superiors or bosses
A pleasant working environment
Using a foreign language
Financial independence
Good chances of promotion
Professional growth
Being a boss/exercising power
Status of my organization

The most important thing for me is…
The second important thing for me is….
I don't consider this aspect of my future job very important because…..
I'm afraid you are mistaken/wrong when you say that….
I think your opinion is absolute nonsense because….
It matters very little for me….
It matters very little in my job….
…. is less significant than….
…. is more significant/ more important than….
I don't attach too much importance to…

6. Write your own CV based on the sample

STEVEN TERRY

Sales Staff

CONTACTS

Male

May 19, 1992

986-2323-3434

Steven@3223.com

Http://steven-info.me

London, England

OBJECTIVE

Take advantages of sales skills & experience and understanding of market to become a professional Sales Staff and bring a lot value to Customers. From that, I will contribute to development of TOPCV Company.

SKILLS

Language: English, Japanese, Chinese

Computer: Word, Excel, Powerpoint

INTERESTS

I like soccer, music..

EDUCATION

Oct 2010 - May 2014

TOPCV University, Major: Corporate Administration

GPA: 3.6/4

Oct 2010 - May 2014

TOPCV University, Major: Corporate Administration

GPA: 3.6/4

WORK EXPERIENCE

June 2014 - Present

TOPCV JSC, Sales Staff

- Write and upload product advertising post via Facebook, Forum...
- Introduce, consult products and answer customers' queries via phone and email.

Nov 2013 - Jun 2014

TOPCV Shop, Part-time Sales Staff

- Sell goods for Foreigners and Vietnamese at the Shop
- Advertise products on media publications such as: banner, posters,leaflets...
- Make reports of sales every day.

ACTIVITIES

Jan 2014 - Feb 2014

TOPCV - EDUCATION TALK 2014, Member of US Ambassador

- Organize monthly events, network with US alumni
- Share how to hunt scholarships and US student's life experiences to all students who have received offers from US universities

HONORS & AWARDS

2013-2014: TOPCV Scholarship in 2nd semester 2012-2013 and 1st semester 2013-2014

REFERENCES

Mr: Jack Harison - Director of TOPCV JSC

Phone: 986-2323-3434

Unit 2. SOFT SKILLS

THEORETICAL PART
TRANSLATION PECULIARITIES OF CONSTRUCTION TERMS

Read and check your understanding.

The construction sector is of great importance for post-war Ukraine. With the increasing number of international construction projects, the development of the international market for building materials, and Ukraine's integration into the European Union, there is a growing need to harmonize the general terminology in this field. In the era of artificial intelligence and computer technologies, the problem of translation will not be urgent, but in technical translation difficulties related to discrepancies with the Eurocodes may arise. At the state level, laws and resolutions have been adopted to bring the legislative framework of Ukraine closer to that of the EU. Firstly, the state concept of adapting the national regulatory framework to EU standards and integrating it into the European regulatory and legal space of technical regulation in construction is clearly formulated. Secondly, today, experts around the world recognize that Eurocode is the latest and most advanced basis for regulatory control in construction. In construction industry Eurocodes only apply to the design of building structures. The structural Eurocodes are anunrivalled set of unified international codes of practice for designing buildings and civil engineering structures [1, p.14]. This set of standards covers the main building construction materials (concrete, steel, timber, masonry and aluminium), all areas of structural design (loads, mechanical strength and stability, fire protection, seismic design, etc.). In 72% of countries more than 80% of the published Eurocodes Parts are available in the national language or into one of the official national languages. [2, p.18]. In Ukraine Eurocode dictionary is published by Gordeev V.M. [3]. Unfortunately, machine translators, chat GPT, etc. cannot translate Ukrainian construction terms into English in accordance with Eurocodes. Therefore, a specialist must carefully review the document and, if necessary, edit it taking Eurocodes into consideration. The following examples demonstrate how the noun "смуга" in terminological phrases is translated into English differently (in accordance with Eurocodes): The term "мостовий кран" corresponds to Eurocode 1.3.11 "overhead travelling crane", but Chat GPT translates it as "bridge crane". The term "опорний кран" corresponds to Eurocode 1.3.14 "top-mounted crane", however, Chat GPT gives a variant of "gantry crane". In any technical translation, problems arise with multi-component terms. For example, the term "еквівалентна поверхня сипкого матеріалу" was translated by Chat GPT word-by word "equivalent surface of bulk material", although in Eurocode 1.4.8. it corresponds to a two-component term "equivalent surface". The term "структура потоку" in Chat GPT is "flow structure", while Eurocode 1.4.11. gives the correspondence "flow pattern". It should be noted that one and the same component in a terminological phrase can be translated into Ukrainian differently. For instance, the word "design" in Eurocodes 1.1.2.27 and 1.1.2.29: design fire scenario – проектний сценарій пожежі; design fire – температурна модель пожежі. However, in Eurocode

1.1.2.28. the terminological phrase “design fire load density” corresponds to the Ukrainian term “розрахункова густина вогневого потоку”, i.e. “design” is translated as an adjective “розрахункова”. It’s not worth applying Chat GPT for translating the term “сталезалізобетонний елемент”. The variant given by AI “reinforced concrete element” doesn’t correspond to Eurocode 4.1.1.1. “composite member”. Although, Eurocode 4.1.1.8. “composite joint” corresponds to Ukrainian “комбінований узол”, i.e. “composite” has quite different translation. It should be noted that printed bilingual technical dictionaries have discrepancies with Eurocodes: e.g., “bulk weight density” is translated in the technical dictionary as “щільність насипної ваги”, while in Eurocodes – as “об‘ємна вага”. The phrase “розрахунок будівельних конструкцій” can be translated into English by machine translators as “structural calculation”.

In Eurocodes 0.64 and 0.65 “розрахунок” is translated as “analysis”: structural analysis, global analysis (загальний розрахунок). The term “анализ” has a broader meaning, which could cause confusion in translation. It is important to consider the context and intended meaning of the term in order to provide an accurate translation. Machine translators may not accurately convey the word “element”: e.g., terminological phrase “зовнішній елемент” is translated in Eurocode 1.1.2.2. as “external member”, not “external element”.

Eurocode 1.1.2.11. conveys the meaning of the term “member” in construction terminology: basic part of a structure (such as beam, column, but also assembly such as stud wall, truss) considered as isolated with appropriate boundary and support conditions. The word “коефіцієнт” may cause difficulties in translation as well: according to Eurocodes, it should be “factor”, e.g., opening factor коефіцієнт врахування отворів (1.1.2.38), коефіцієнт впливу форми configuration factor (1.1.2.42.). Although, this word is transcribed in the following Eurocode: коефіцієнт конвекційної теплопередачі – convective heat transfer coefficient (1.1.2.43.).

Thus, when translating construction terminology into English, a specialist should coordinate the final result with the Eurocodes dictionary. However, the most important thing is that the specialist should be aware of the existence of such a dictionary. In practice not only translators, but also construction specialists are unaware of the existence of such a dictionary.

The same word in the source language can have different translations in English, for example, *граничнодопустиме значення шкідливого чинника* can be translated as *threshold value of harmful factor* or *permissible concentration*; *виробниче приміщення* can be translated as *industrial facilities*, while *виробниче середовище* can be translated as *work environment*. Such synonymy in English translation is mainly represented by doublets - semantically identical units.

Many Ukrainian terms formed by stem compounding in English translation are two-component terms: *вогнестійкість* is translated as *fire resistance*, *вогнезахист* as *fire protection*, *теплопровідність* as *thermal conductivity*, and т*еплообмінники* as *heat exchangers*. However, *турбокомпресор* in English translation has an equivalent stem compounding – *Turbocharge*r.

It should be noted that there are syntactic features of term translation. Government is a syntactic relationship between words in which the dependent word has the case required by the main word. The peculiarity of government in English terms is that it is non-prepositional. As a rule, prepositions are used in Ukrainian. For example, *шкода від пожежі* can be translated as *fire harm*, and *вимоги до систем вентиляції* as *ventilation system requirements*.

Transliteration: *робот – robot; фільтр – filter; радіус – radius;*

Transformations. Transformations are used when the terms in the source text have a different structural-functional order in the target text. Among lexical, grammatical, and stylistic translation transformations in translating terms related to machine building engineering, grammatical transformations predominate:

substitution of singular with plural: *техніка безпеки – safety measures; виробничий травматизм – industrial injuries*;

change of a part of speech: *державний стандарт – the state standard*;

change in word order: *equipment vendor – постачальник обладнання; energy consumption – споживання енергії;*

addition: *energy audit reporting – представлення звіту за результатами енергоаудиту; maintenance work – роботи з технічного обслуговування;*

It should be noted that as a result of addition, Ukrainian terms usually become multi-component terms in English.

omission: *арматурний прокат в мотках – rebar in coils*.

Calque. This is a technique where the component parts of a word are translated by the corresponding elements in the target language. Calque can only be applied when the translation equivalent does not violate the norms of usage and word combination in the Ukrainian language. Calque is not always a simple mechanical operation aimed at transferring the source form into thetarget form. For example: *гнучка автоматизація – flexible automation; допуск форми – form tolerance*.

SELF-ASSESSMENT

1. How is the term "мостовий кран" translated according to Eurocodes?
A) Bridge crane
B) Top-mounted crane
C) Overhead travelling crane
D) Gantry crane
2. Which English translation corresponds to the Eurocode term "розрахунок будівельних конструкцій"?
A) Structural calculation
B) Structural design
C) Structural analysis
D) Structural determination
3. How should the term "зовнішній елемент" be translated in accordance with Eurocodes?
A) External component
B) External element

C) External part
D) External member
4. What is the correct Eurocode translation for "теплопровідність"?
A) Heat conduction
B) Thermal resistance
C) Thermal conductivity
D) Heat transfer
5. What translation transformation occurs in the term "енергоспоживання" (energy consumption)?
A) Substitution of singular with plural
B) Addition of a new component
C) Change in word order
D) Calque translation
6. How does Eurocode suggest translating the phrase “розрахунок будівельних конструкцій”?
A) Structural calculation
B) Construction planning
C) Structural analysis
D) Global evaluation

PRACTICAL PART

I. Preparation

Before reading study the following vocabulary:

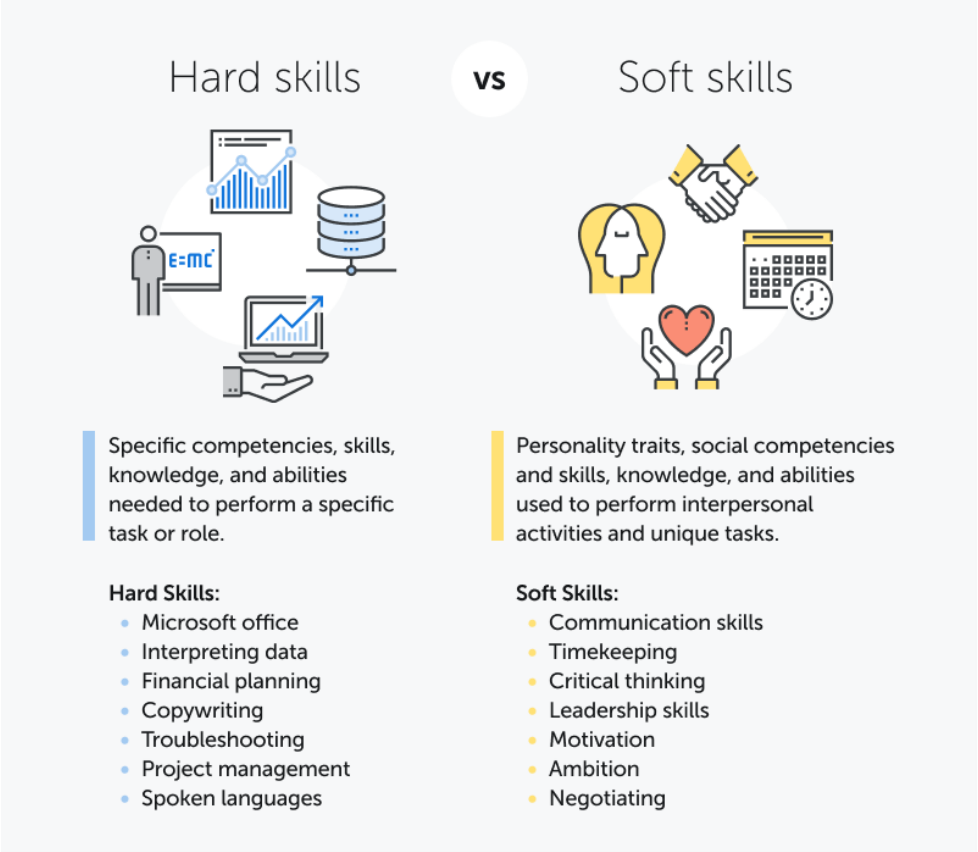
to perform
to define
abilities
negotiating
troubleshooting
measurable
specific tasks
requirements
accurate
to highlight
to elaborate

II. Reading Text

Hard skills vs. Soft skills

When you are looking for new recruits or promoting from within there will be a set of skills your roles require. Some skills people will have as part of their nature, while others need to be taught.

The hard skills can be defined as part of the role specification. And soft skills are defined as the person specification.



What are Hard Skills?

Hard skills are specific competencies, skills, knowledge, and abilities needed to perform a specific task or role. They can be learned through education and professional development. Usually, they are technical (but not always) and easily measurable.

Hard skills can be demonstrated through educational certificates or practical demonstrations.

For example, software development requires knowledge of some programming language and can be used for a variety of tasks, but the main goal is to write a computer program. The proficiency level can be easily measured.

Another example, design (of course it can be different - interior design, web design, etc.) but in general it is a specific skill set needed to perform exact tasks.

Microsoft suite knowledge, another example of hard skills, you can learn how to use Microsoft Word and Excel, and most often it will be needed for specific tasks.

So, each role will have different skill set requirements but they will be needed to perform a specific task.

Soft skills are personality traits, social competencies and skills, knowledge, and abilities used to perform interpersonal activities and unique tasks. Sometimes they are also called *human* skills.

Usually, they are more closely linked to people's personality traits they are born with and social skills. But they also can be trained and developed through practice and professional development.

Unfortunately, it is not that easy to gauge if someone has the right soft skills as there is less information to draw upon. This is especially true when hiring new employees as their soft skills will need to be assessed by getting to know them.
There are specific techniques and tests that can be used to measure soft skills, but note the results will be quite vague and not accurate. Only real-life situations will display how good people are in this area.

Certain soft skills you would ideally like all of your employees to have are punctuality and collaboration. Other skills might only be necessary for specific roles like leadership, communication, strategic thinking, and problem-solving.

Soft skills don't come with certification but they are easily identified while working with someone. People with leadership skills will naturally take ownership and step up to lead. Those who are excellent timekeepers will always be on time or be forthcoming about potential lateness.

How to highlight your skills throughout the interview process

Once you make it to the interview phase, you will have an opportunity to display your soft skills and elaborate more on your hard skills. You may be asked to display your hard skills with a test or portfolio.

You can highlight key soft skills by:

Showing up on time or early to the interview (punctuality or dependability)
Maintaining eye contact (active listening)
Speaking clearly when prompted (effective communication)
Answering questions about your resume and experience honestly (integrity)
Asking follow-up questions (active listening)

You can highlight your hard skills by:

Elaborating on your experience and training
Providing a portfolio (digital or physical)
Effectively answering technical questions related to the work
Asking follow-up questions related to the work
Effectively working through skills tests (if required at the interview)

(From: https://www.valamis.com/hub/hard-skills-vs-soft-skills)

✍ After-text exercises

1.Tick the sentences true/false:

1) Hard skills may be easy to observe, quantify, and measure.
2) Hard skills are not generally listed in the job postings or job descriptions.
3) Hard skills are often learned in schools, Universities, and from books.
4) Soft skills are the Non-Technical Skills necessary for success in the workplace.
5) Soft skills are not typically associated with the behaviors and personality traits of an individual.

2. Insert the appropriate word or word combination from Vocabulary:

1) Hard skills are technical (but not always) and easily ….
2) We need someone who is practiced at … business deals.

3) He’s very good at … because he knows these computers as well as anybody.
4) The report … the need for improved safety.
5) He refused … on why he had resigned.
6) The figures they have used are just not …
7) We usually ask interviewees … a few simple tasks on the computer just to test their aptitude.
8) One of the …of the job is fluency in two or more languages.

3. Answer the questions:

1) What soft skills do you have?
2) What soft skills would you like to have?
3) Is it possible for a person to have all of them?
4) What soft skills should an engineer have?
5) What steps should be taken to develop soft skills?
6) What is troubleshooting
7) Evaluate your hard skills.

4. Speak about the differences between hard and soft skills.

5. Find simple, derivative, complex and multicomponent terns in the text. Translate it into Ukrainian. What translation techniques did you apply?

In modern **construction**, efficient **planning** and **scheduling** are critical for project **success**. Engineers must evaluate the **load-bearing** capacity of each **structural** component, such as **beams**, **columns**, and **foundation systems**. Specialized **load-distributing** materials, like reinforced concrete, are often used in high-stress areas to ensure **stability**. **Architectural** elements like walls, **roofs**, and **flooring** are also essential, each with its own **specifications** and **installation** requirements.

The **prefabrication** of certain **structural** elements has become common to improve **efficiency** and **reduce** overall costs. Complex systems, such as **HVAC (heating, ventilation, and air conditioning)**, are integrated into buildings to control **temperature** and **air quality**. Adhering to **safety regulations** and ensuring **compliance** with local and international **codes** like Eurocodes are essential for ensuring both **worker** and **occupant safety**.

For large-scale **commercial building projects**, **energy-efficient structural systems** are increasingly in demand. These projects often require **high-strength reinforced concrete** and **seismic-resistant frameworks** to withstand environmental forces. In many cases, the use of **thermal insulation materials** and **acoustic dampening panels** is specified to improve **indoor environmental quality** and meet **sustainability standards**. Additionally, **building information modeling (BIM)** systems facilitate the **coordination of multi-disciplinary teams**, allowing for accurate **3D visualization** and streamlined **construction management processes**. Adherence to **Eurocode seismic design guidelines** and **fire protection standards** ensures the **safety and durability** of the structure throughout its lifespan.

UNIT 3. MY SPECIALTY

THEORETICAL PART

TRANSLATION OF MULTICOMPONENT TERMS

Read and check your understanding.

Multicomponent terms have great importance in any scientific or technical texts because they have a clear scientific definition, possess stability and semantic integrity of the concept being represented. Multicomponent terms include multi-word expressions with three or more components. For example, "*правила пожежної небезпеки*" can be translated as "*fire safety rules*."

The emergence of a significant number of multi-component terms in construction terminology in is associated with the fact that this field has very close ties to a range of scientific and technical disciplines (physics, mechanics, electrical engineering, energy, mathematics, etc.). However, multi-component term-phrases can eliminate ambiguity in terminology.

Multicomponent terms in English consist of a base component (BC), one or several left modifiers (LM), and one or several prepositional modifiers (PM) that specify and modify the meaning of a term. English multicomponent terms with typical left deployment have dependent components that are located to left of the base component, while for Ukrainian multicomponent terms, the opposite is true with typical right deployment. This fact should be taken into account when translating multicomponent terms.

In general, the structural scheme of a terminological group in the target language (TL) can be presented in the following form:

LMn←LM2←LM1←**BC**

For example, a multi-component term "*акт про нещасний випадок на виробництві*" (literally "act about an accident at the production") is translated as "*occupational accident-related act*". The main component in the source language, "акт" (act), becomes the last component in the translated term, then the sequence of translated components is unfolded from left to right. Another example: *коефіцієнт використання стану – mill utilization factor*.

The translation of multicomponent construction terms requires careful consideration of the directionality of translation, whether from right to left (R2L) or left to right (L2R). These approaches depend on the structural and syntactic norms of the source and target languages. In construction terminology, this process involves the accurate conveyance of technical meaning while adhering to linguistic and contextual constraints.

2. Translation from Right to Left (R2L)

This approach focuses on translating the core element first and then adding modifiers or descriptors to clarify the meaning. Common in languages like Ukrainian, where modifiers (e.g., adjectives, descriptors) often precede the noun. Helps retain the syntactic structure of the source language.

Examples

Ukrainian to English:

поверхня підлоги з бетону → concrete floor surface.
Core term (*surface*) is identified first, followed by its descriptors.
еквівалентна поверхня сипкого матеріалу → equivalent surface (Eurocode term).
Modifier (*equivalent*) precedes the core (*surface*).

3. Translation from Left to Right (L2R)

This approach begins with modifiers or descriptors and ends with the core term, aligning more naturally with English word order. Standard in English, where modifiers generally precede the noun. Ensures the translated term reads naturally and is grammatically correct in English.

Examples

English to Ukrainian:
load-bearing wall → несуча стіна.
Descriptive element (*load-bearing*) precedes the core (*wall*).
thermal conductivity coefficient → коефіцієнт теплопровідності.
Key term (*coefficient*) is placed last in the Ukrainian phrase.

4. Reconciling R2L and L2R Approaches in Construction Terms

Semantic Accuracy vs. Syntactic Norms

The translation must prioritize semantic accuracy to ensure the technical meaning is preserved.
Eurocodes often provide standardized translations for multicomponent terms, helping bridge the gap between approaches.

Examples of Ambiguities and Resolutions

"Еквівалентна поверхня сипкого матеріалу":
Word-for-word translation (R2L): *equivalent surface of bulk material*.
Eurocode-approved term (L2R): *equivalent surface*.
"Гранично допустиме значення шкідливого чинника":
R2L: *permissible concentration of harmful factor*.
L2R: *threshold value of harmful factor*.

5. Translation Strategies for Multicomponent Terms

A. Identifying the Core Term

Pinpoint the main concept or noun (e.g., *beam*, *surface*, *coefficient*).

B. Analyzing Modifiers

Identify descriptors and their hierarchical relationship with the core term.

C. Applying Eurocode Standards

Use standardized Eurocode dictionaries to cross-check translations.

D. Ensuring Contextual Compatibility

Adjust word order based on the target language's syntax.

Thus, translating a multi-component term consisting of four, five, or more components means:

- establishing inter-component connections in the terminological phrase;
- identifying the main component – the headword of the term-phrase and translating it;
- translating all isolated basic terms within the multi-component term that are semantically related to the main component, based on context and taking into account the specific terminology of the corresponding science;

- performing the actual translation of the multi-component term (usually translating from right to left, starting with the main component, and coordinating the previously translated basic units with each other);
- verifying the accuracy of the translation using dictionaries, reference literature, or internet search engines to ensure that such a term actually exists in the professional construction environment.

To sum it up, the main way of creating multi-component terms is syntactic, i.e. non-prepositional. For English multi-component terms with typical left deployment, dependent components are located to the left of the main component, while for Ukrainian multi-component terms, on the contrary, right deployment is typical.

SELF-ASSESSMENT

1. What is a multicomponent term?
   a) A term that consists of multiple words
   b) A term that consists of multiple components that have specific meanings and are used in specific contexts
   c) A term that has multiple translations in different languages
2. What is the main method of creating multicomponent terms?
   a) Semantic derivation
   b) Syntactic derivation
   c) Borrowing from other languages
3. What is the typical word order for English multicomponent terms?
   a) Left-to-right
   b) Right-to-left
   c) It depends on the type of term
4. What is the main component of a multicomponent term?
   a) The first component
   b) The middle component
   c) The head component that gives the term its meaning
5. What is the process of translating a multicomponent term?
   a) Breaking it down into its individual components and translating each one separately
   b) Translating the term as a whole, without considering its components
   c) Identifying the core component and translating it, while also considering the meanings of the other components in the specific context
6. What is the importance of considering the word order in multicomponent terms during translation?
   a) It is not important and can be ignored
   b) It is important for maintaining the correct syntax and grammar in the target language
   c) It is important for determining the correct meanings of the individual components in the source language?
7. What are some strategies for verifying the accuracy of a translated multicomponent term?

a) Consulting dictionaries and reference materials
b) Checking the translation with a native speaker of the target language
c) Searching for the term in online databases and specialized resources

8. What is the most common direction for translating multicomponent terms?
a) Left-to-right
b) Right-to-left
c) It depends on the type of term and the language pair involved

9. What is the difference between a multicomponent term and a compound word?
a) There is no difference, they are synonyms
b) A multicomponent term is a technical or specialized term, while a compound word is a more general term
c) A compound word is a type of multicomponent term that is commonly used in everyday language

10. What is the purpose of using multicomponent terms in technical or specialized fields?
a) To create confusion and obscure meaning
b) To simplify communication and provide a precise, unambiguous vocabulary
c) To make communication more colorful and interesting

PRACTICAL PART

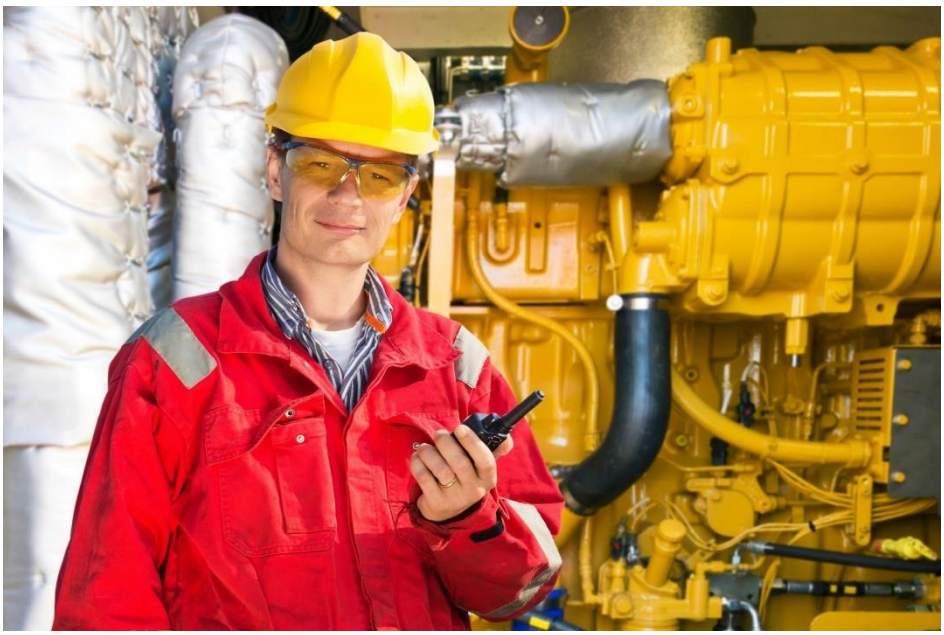
I. Preparation

Before reading study the following vocabulary:

Welding equipment
Sustainable mining practices
Mining pits
Design drawings
Field research
Alloys
Personal protective equipment
Conflict resolution
Quality assurance

II.Reading Text

Construction Engineers: Career, Skills, Degree and Salary



A career as a construction engineer offers diverse opportunities in both public and private sectors, focusing on the design, planning, and execution of infrastructure projects. Construction engineers play a critical role in shaping the built environment, working on projects ranging from roads, bridges, and buildings to water treatment facilities and transportation systems. As they advance, construction engineers can specialize in areas like project management, structural engineering, environmental engineering, or construction safety.

Key Skills for Construction Engineers:

1. **Technical Proficiency**: Construction engineers need a strong understanding of engineering principles, materials science, and structural analysis. They should be skilled in using computer-aided design (CAD) software, Building Information Modeling (BIM), and project management tools to create accurate plans and designs.
2. **Project Management**: Construction engineers often oversee projects from start to finish, coordinating teams, managing timelines, and ensuring that projects stay on budget. Skills in scheduling, resource allocation, and risk assessment are crucial for efficient project management.
3. **Problem-Solving Abilities**: In construction, unforeseen challenges are common. Engineers must have strong problem-solving skills to address issues like delays, budget constraints, or design adjustments without compromising quality or safety.
4. **Communication Skills**: Effective communication with architects, contractors, clients, and regulatory bodies is essential. Construction engineers must explain technical information clearly and collaborate with diverse teams to ensure project goals are met.
5. **Attention to Detail**: Construction engineers work with precise measurements and complex regulations, particularly when following standards such as Eurocodes for

building safety. Attention to detail is critical for preventing errors in designs, calculations, and on-site implementations.

6. **Knowledge of Safety Standards**: Ensuring compliance with safety and building regulations is a primary responsibility. Familiarity with codes and standards like OSHA guidelines, Eurocodes, and environmental regulations helps construction engineers create safe, sustainable structures.
7. **Sustainability Awareness**: As the industry shifts towards eco-friendly practices, construction engineers are increasingly involved in designing sustainable buildings that minimize environmental impact. This includes understanding energy-efficient materials, waste reduction, and sustainable construction methods.

Career Path and Opportunities

Construction engineers can start as entry-level field engineers or project assistants, then move into roles such as project engineer, site manager, or project manager. With experience and further education, they may progress to positions like senior project manager, construction director, or consultant. Some construction engineers also pursue roles in regulatory agencies, where they oversee compliance and safety standards at a governmental level.

In a fast-evolving field, construction engineers who keep up with new technologies, sustainable practices, and international standards find strong career prospects in a range of industries, from construction firms and consulting agencies to government organizations and environmental agencies.

Construction engineering offers several specializations, allowing professionals to focus on specific areas within the field. These specializations enable engineers to develop expertise in areas that align with their interests and career goals:

1. **Structural Engineering**
   Structural engineers focus on the design and analysis of buildings, bridges, and other structures to ensure they can withstand stresses and environmental conditions. They use advanced modeling and simulation tools to analyze load-bearing capacity, earthquake resistance, wind loads, and other factors affecting stability and safety.
2. **Geotechnical Engineering**
   Geotechnical engineers specialize in analyzing soil, rock, and groundwater conditions to determine the best methods for foundation and earthworks. They play a crucial role in assessing site suitability, managing landslide risks, designing stable foundations, and ensuring the safety of underground structures, tunnels, and retaining walls.
3. **Construction Management**
   This specialization combines engineering expertise with project management skills, focusing on the planning, coordination, and oversight of construction projects. Construction managers handle budgeting, scheduling, resource

allocation, risk management, and compliance to ensure that projects are completed on time and within budget.

4. **Environmental Engineering**
   Environmental engineers in construction focus on sustainable practices and environmental impact mitigation. They work on projects involving waste management, water and air pollution control, and sustainable resource use, as well as on the integration of eco-friendly building materials and energy-efficient systems.
5. **Transportation Engineering**
   Transportation engineers design and develop infrastructure for roads, highways, rail systems, airports, and other transportation facilities. They work on traffic management, safety measures, and systems that improve efficiency and minimize environmental impact.
6. **Water Resources Engineering**
   Water resources engineers specialize in the management and distribution of water systems. They design and oversee the construction of dams, canals, pipelines, drainage systems, and water treatment facilities, ensuring water quality and availability for communities and industries.
7. **Building Information Modeling (BIM) Specialist**
   BIM specialists focus on digital modeling and simulation, using BIM software to create detailed, 3D representations of construction projects. They work on project visualization, coordination, and simulation, enabling better decision-making, cost estimation, and construction planning.
8. **Construction Safety Engineering**
   Safety engineers develop and implement safety protocols and procedures on construction sites. They ensure that projects adhere to safety standards, such as OSHA regulations, and work to minimize risks to workers through hazard assessments and the design of safe work environments.

✍ After-text exercises

1. Insert the appropriate word or word combination from the text:

1) In _____ engineering, professionals analyze soil and rock conditions to ensure stable foundations.
2) A _____ specializes in the coordination and management of all aspects of a construction project, from budgeting to scheduling.
3) _____ engineering focuses on designing structures to withstand forces from earthquakes.
4) Construction engineers use _____ to create 3D models that facilitate project visualization and planning.
5) Environmental engineers in construction work on _____ practices, such as waste management and pollution control.
6) A _____ engineer is responsible for assessing load-bearing capacity and structural stability of buildings and bridges.

Word Bank: construction management, structural, geotechnical, sustainable, seismic, Building Information Modeling (BIM)

2. Match the words with their definitions:

Term	Definition
1)Technical Proficiency	a) Addressing unforeseen challenges in projects, such as budget adjustments and design changes.
2) Project Management	b) Specializes in designing facilities like dams, pipelines, and water treatment systems for water distribution.
3) Structural Engineering	c) Ensuring construction projects comply with safety regulations and minimizing risks to workers.
4) Geotechnical Engineering	d) Focused on the development and management of infrastructure for roads, highways, and public transit.
5) Problem-Solving Abilities	e) Knowledge of engineering principles, materials science, and structural analysis, along with software skills.
6) BIM Specialist	f) Understanding eco-friendly practices to reduce environmental impact in construction projects.
7) Sustainability Awareness	g) Designing and analyzing structures to ensure they can withstand environmental stresses and loads.
8) Construction Safety Engineering	h) A digital modeling professional who creates 3D project simulations to improve planning and coordination.
9) Environmental Engineering	i) Analyzing soil, rock, and groundwater conditions to assess site suitability for construction foundations.
10) Transportation Engineering	j) The ability to convey technical information effectively to diverse stakeholders in a construction project.
11) Water Resources Engineering	k) Designing and managing systems to control water, air, and waste pollution in construction.
12) Communication Skills	l) The management and allocation of resources, timelines, and tasks to complete projects within a set scope.

3. Answer the questions:

1) Describe two key skills necessary for a construction engineer to manage a project efficiently.
2) How does a geotechnical engineer contribute to a construction project?

3) What are the main responsibilities of an environmental engineer on a construction site?
4) Why might Building Information Modeling (BIM) be especially useful for large-scale projects?
5) How does construction safety engineering benefit both workers and project outcomes?
6) What type of engineering specialization focuses on the durability and testing of materials used in construction?
7) Is that profession essential in Ukraine? Why?
8) Why did you decide to become an engineer?

4. Write down multicomponent terms from Glossary (Appendix A) and the Text and complete the table:

multicomponent terms translated from the right to the left	multicomponent terms translated from the left to the right
1.	
2.	
3.	

5. Speak upon the topic "My Specialty" according to the template:

- Introduction (introduce your profession, explain why you chose it);
- Skills and Knowledge (describe the specific skills and knowledge required for your specialty);
- Work environment (explain the typical work environment, discuss any challenges or rewards associated with working in your fields);
- Career Paths (outline the various career paths, discuss any trends in the industry that may impact career prospects);
- Conclusion (summarize your thoughts on your specialty and its importance).

UNIT 4. CONSTRUCTION INDUSTRY

THEORETICAL PART

STRUCTURAL PECULIARITIES OF CONSTRUCTION TERMS

Read and check your understanding.

In construction terminology, you'll often find a variety of structural peculiarities in terms based on their complexity and composition. Let's break down some examples:

Simple Terms: These are basic terms that consist of a single word representing a concept or component in construction. Examples include *wall, beam, column,* or *roof*. Simple terms are straightforward and often serve as building blocks for more complex terminology.

Compound Terms: Compound terms are formed by combining two or more simple terms to create a new concept or describe a specific component or process. These terms typically follow a pattern of noun-noun or adjective-noun combinations. For instance, *concrete mixer*, *steel beam*, *load-bearing wall*, or *insulation panel* are compound terms commonly used in construction. They provide more precise descriptions by combining multiple elements into one term.

Complex Terms: Complex terms involve additional elements such as prefixes, suffixes, or modifiers to further specify or modify the meaning of the base term. These elements can indicate characteristics such as size, function, material, or operation. For example, *high-rise building* includes the adjective *high* to specify the building's height, while *reinforced concrete slab* uses the modifier *reinforced* to indicate its additional strength.

Derivative Terms: Derivative terms are formed by modifying an existing term to create a new word with a related meaning. This modification can involve adding a prefix or suffix, altering the spelling, or combining elements from different languages. In construction, derivative terms often arise from technological advancements, industry jargon, or specialized applications. Examples include *prefabrication*, *modularization*, *renovation*, or *insulation*.

2. The typical structure models for construction terms are:

- Noun+Noun

Heat exchanger,
Power distribution,
Force sensor,

- *Participle I* + Noun:

Cutting tool,
Mixing tank,

- Adj. + Noun + Noun:

linear displacement sensor,

high precision lathe,

- *Noun+Noun+Noun:*

gang type lathe,
bevel gear cutter,

- *Participle II +Noun+Noun:*

integrated machine system,
finished goods warehouse.

When translating from one language to another, understanding the structural model of terms in the source language helps translators accurately convey the intended meaning in the target language. Understanding the structural model of terms facilitates the identification of equivalent expressions or constructions in the target language that best capture the original meaning.

SELF-ASSESSMENT

1. Which of the following is an example of a simple construction term?

a) Steel column
b) Load-bearing wall
c) Beam
d) Concrete slab

2. What type of term is *reinforced concrete slab*?

a) Simple term
b) Compound term
c) Complex term
d) Derivative term

3. Which of the following is a compound construction term?

a) Steel beam
b) Modularization
c) Concrete mixer
d) Wall

4. What does the term *high-rise building* represent?

a) A simple term
b) A derivative term
c) A compound term
d) A complex term

5. *Renovation* is an example of which type of term?

a) Derivative term
b) Compound term
c) Simple term
d) Complex term

6. The term *cutting tool* follows which structural pattern?

a) Participle I + Noun
b) Noun + Noun
c) Adjective + Noun + Noun
d) Participle II + Noun + Noun

7. Which term is an example of an adjective-noun-noun combination?

a) Load-bearing wall
b) High precision lathe
c) Steel column
d) Concrete mixer

8. Which term is an example of a noun + noun + noun combination?

a) Integrated machine system
b) Bevel gear cutter
c) Mixing tank
d) High-rise building

9. *Modularization* is an example of which type of term?

a) Derivative term
b) Compound term
c) Complex term
d) Simple term

10. Which of the following terms is an example of a participle II + noun + noun construction?

a) Finished goods warehouse
b) Cutting tool
c) Power distribution
d) Linear displacement sensor

PRACTICAL PART

I.Preparation

Before reading study the following vocabulary:

Subcontractors
Blueprints
BIM (Building Information Modeling)
Modularization
Prefabrication
Renovation
Risk Management
Compliance
Recyclable materials
sustainable

II.Reading a text.

What Is Construction Industry?

The construction industry is a vital sector in the global economy that encompasses the planning, design, building, and maintenance of infrastructure, buildings, and other construction projects. It involves a wide range of activities, from residential housing to large-scale commercial, industrial, and public works projects. Construction work is typically carried out by construction companies, contractors, subcontractors, architects, engineers, and skilled tradespeople.

The industry is responsible for creating the physical structures and infrastructure that people rely on for living, working, and transportation. These projects include roads, bridges, schools, hospitals, airports, and utilities such as water and electricity systems. Construction projects vary greatly in size and complexity, requiring specialized knowledge, tools, and materials.

The construction industry plays a significant role in providing employment worldwide, with millions of workers engaged in various tasks, such as carpentry, masonry, plumbing, electrical work, and project management. It also contributes heavily to the economy through the demand for raw materials, machinery, and technological advancements.

Modern construction practices often involve the use of advanced technologies, such as computer-aided design (CAD), building information modeling (BIM), and construction robotics. These technologies have helped improve efficiency, accuracy, and safety in construction processes. Sustainability and eco-friendly building practices are also becoming more prevalent in the industry, with a growing emphasis on reducing energy consumption and using recyclable materials.

Construction projects are typically divided into phases, including the design phase, pre-construction phase, construction phase, and post-construction phase. Each phase requires careful planning, budgeting, and coordination among various professionals to ensure successful project completion. Legal regulations, building

codes, and safety standards play an essential role in ensuring that construction projects are completed in a safe and compliant manner.

Construction is a high-risk industry, with hazards ranging from equipment accidents to falling from heights, making safety protocols and risk management essential. Project timelines and budgets often face challenges such as weather conditions, supply chain issues, and labor shortages, which can impact the overall success of a project.

The industry is influenced by economic trends, government policies, and demographic changes. For example, urbanization and population growth drive demand for housing, schools, and transportation infrastructure, while advancements in technology shape the materials and techniques used in construction. Global issues like climate change and environmental concerns also impact the construction sector, pushing for more sustainable practices and green building initiatives.

Overall, the construction industry is a cornerstone of modern society, providing the physical infrastructure that supports economic development, improves quality of life, and enhances social mobility. It is a dynamic and ever-evolving field that continues to adapt to new challenges and opportunities, offering diverse career paths for individuals with various skill sets and expertise.

SELF-ASSESSMENT

1. **What is the primary role of the construction industry?**

a) To manufacture raw materials
b) To design and construct buildings, infrastructure, and other structures
c) To sell construction equipment
d) To manage financial institutions

2. **Which of the following is NOT typically a part of a construction project?**

a) Project management
b) Software development
c) Design and planning
d) Site preparation

3. **What does BIM stand for in the context of construction?**

a) Building Information Management
b) Building Integrated Modeling
c) Building Information Modeling

d) Basic Installation Methods

4. **Which of the following is a common construction material?**

a) Wood
b) Steel
c) Concrete
d) All of the above

5. **What is the term for a person responsible for overseeing a construction project from start to finish?**

a) Architect
b) Project Manager
c) Civil Engineer
d) Contractor

6. **Which phase of a construction project involves creating blueprints and obtaining permits?**

a) Post-construction phase
b) Design phase
c) Construction phase
d) Pre-construction phase

7. **What is the primary purpose of construction safety regulations?**

a) To increase the cost of construction
b) To ensure the well-being of workers and reduce risks on site
c) To simplify the construction process
d) To meet environmental goals

8. **Which of the following is a major challenge in the construction industry?**

a) Inconsistent weather conditions
b) Increasing demand for technology
c) Managing construction timelines
d) All of the above

9. **Which construction project would most likely involve the use of heavy machinery like cranes and bulldozers?**

a) Building a residential house
b) Building a skyscraper
c) Renovating a school

d) Constructing a small bridge

10. **Sustainable construction practices aim to:**

a) Reduce the cost of materials
b) Minimize environmental impact and conserve energy
c) Use as much concrete as possible
d) Speed up the construction process

✍ After-text exercises

1. **Answer the questions**:
   1) How does Building Information Modeling (BIM) improve the efficiency and accuracy of construction projects?
   2) In what ways can sustainability practices be incorporated into construction projects to reduce environmental impact?
   3) What are the primary responsibilities of a project manager during the construction phase of a project?
   4) Explain the role of subcontractors in the construction industry and how they contribute to the success of a project.
   5) How does modularization and prefabrication benefit construction projects in terms of cost, time, and quality?
   6) What are some common risks associated with construction projects, and what steps can be taken to manage these risks?
   7) What are the key differences between renovation and new construction, and what challenges are involved in each process?

2.True/false:
   1) The construction industry is responsible for building infrastructure such as roads, bridges, and airports.
   2) BIM (Building Information Modeling) is a software used exclusively for architectural design without involving construction management.
   3) Renovation refers to the process of demolishing an old building and constructing a new one from scratch.
   4) Subcontractors are hired by the general contractor to perform specific tasks such as electrical work or plumbing.
   5) Sustainability in construction only focuses on the aesthetic aspects of a building.
   6) Risk management in construction involves identifying potential hazards and taking steps to minimize them during a project.
   7) Prefabrication is the process of assembling building components off-site before transporting them to the construction site for final assembly.

3.

3. **Complete the table: write down the terms from Glossary according to their morphological structure:**

Simple	Derivatives	Complex	Compound

4. **Speaking.** Discuss the role, importance, and challenges of construction industry according to the plan:

Role of the Construction Industry
Building Infrastructure: Roads, bridges, airports, and utilities.
Residential and Commercial Construction: Housing, office buildings, schools, hospitals, etc.
Industrial Development: Factories, power plants, warehouses, etc.
Job Creation: Employment opportunities for skilled workers and professionals.
Importance of the Construction Industry
Economic Impact: Contribution to GDP, growth of related industries (steel, cement, etc.).
Social Impact: Development of communities, improving quality of life, enhancing living standards.
Environmental Considerations: Sustainable construction practices, energy-efficient buildings, eco-friendly materials.
Urbanization and Population Growth: Addressing the demands of growing cities and populations.
Challenges in the Construction Industry
Financial Challenges: Managing budgets, dealing with cost overruns, financing large-scale projects.
Labor Shortages: Demand for skilled labor versus available workforce, training, and retention.
Safety Risks: The high risk of accidents, importance of safety regulations and training.
Environmental Sustainability: Balancing development with environmental preservation, reducing carbon footprint.
Conclusion
Summary of the key points: the role, importance, and challenges of the construction industry.

CHAPTER 2. ACADEMIC COMMUNICATION
UNIT 5. WRITING PAPERS, ABSTRACTS, SUMMARIES, ANNOTATIONS, CONFERENCE PROCEEDINGS

THEORETICAL PART

Read and check your understanding.

Academic papers, abstracts, annotations, etc. belong to formal style.

Formal style includes:

- impersonal not colloquial or chatty language
- only facts
- not irrelevant details
- use of reporting verbs and passive voice
- no use of short forms

The structure of an **academic paper** can vary depending on the specific discipline, journal or publication guidelines, and the nature of the research. However, a typical structure may include the following sections:

Title page: Includes the title of the paper, the authors' names and affiliations, and the date of publication.

Abstract: Provides a brief summary of the research, including the research question, methods, results, and conclusions.

Introduction: Introduces the topic and research question, provides background information and context, and outlines the purpose and objectives of the study.

Literature Review: Reviews the relevant literature related to the research question, and synthesizes the previous research to establish a theoretical framework or research gap that the current study addresses.

Methods: Describes the research design, participants or subjects, data collection procedures, and analysis methods.

Results: Presents the findings of the study, usually with the aid of tables, graphs, and figures.

Discussion: Interpretation of the results, analysis of the data, and comparison to previous research.

Conclusion: Summarizes the main findings of the study, identifies the implications and contributions of the research, and suggests avenues for future research.

References: Lists all the sources cited in the paper according to the required citation style.

Appendices (optional): Includes additional material that supports the study, such as questionnaires, transcripts, or additional figures and tables.

You can find common phrases used in academic papers in Appendix B.

Annotation is a shorten version of the paper written for people who may never read the full version. There are 2 types: descriptive and informative. *Descriptive annotation*: present tense. Generalized vocabulary and phrases.

Informative annotation: past tense. Precise specific language including numbers.

Annotation structure:

1. Introduction (explanation)\explanation of the title.
2. Discussing the characteristic features of the problem (the aim of the research).
3. Methods and materials describing method equipment and conditions of the experiments.
4. Results (main findings).
5. Pros and cons (recommendations).
6. Conclusion.

Clinches for annotation writing

The object (purpose) of this paper is to present (to discuss, to describe, to show,

to develop) …

The paper (article) discusses some problems relating to (deals with some aspects

of, considers the problem of, presents the basic theory of, and provides information

on) …

The objective of this article is …

The work is divided into … major parts.

The first part deals with …

Then follows a discussion on …

Then the author goes on to the problem of …

The next part presents (describes, discusses) …

After discussing the author turns to …

The final part states …

The conclusion is that the problem is …

According to the author …

The author concludes that …

In summing up the author …

Evaluating the situation the conclusion can be drawn that …

In my opinion (to my mind, I think) …

The paper is interesting (not interesting), of importance, valuable (invaluable), upto-

date (out-of-date), useful (useless) …

It gives (doesn't give) me more technical terms …

It enlarges (doesn't enlarge) the scope in the sphere of …

An abstract is a 150- to 250-word paragraph that provides readers with a quick overview of your essay or report and its organization. It should express your thesis

(or central idea) and your key points; it should also suggest any implications or applications of the research you discuss in the paper

Typically, an abstract for paper or presentation is one or two paragraphs long (120 – 500 words). Abstracts usually spend

- 25% of their space on the purpose and importance of the research (Introduction)
- 25% of their space on what you did (Methods)
- 35% of their space on what you found (Results)
- 15% of their space on the implications of the research

Sample of an abstract:

Purpose This paper analyzes how novices and experts can safely adapt and transfer their skills to new technology in the medical domain.

Methods To answer this question, we compared the performance of 12 novices (medical students) with the performance of 12 laparoscopic surgeons (using a 2D view) and 4 robotic surgeons, using a new robotic system that allows 2D and 3D view.

Results Our results showed a trivial effect of expertise (surgeons generally performed better than novices). Results also revealed that experts have adaptive transfer capacities and are able to transfer their skills independently of the human-machine system. However, the expert's performance may be disturbed by changes in their usual environment.

Implications From a safety perspective, this study emphasizes the need to take into account the impact of these environmental changes along with the expert's adaptive capacities.

A summary is the information from a text or an article. The summary contains an essential information of the literary sources. Writing summary one must understand the main ideas of any reading paper. The information of the original literary sources should be compressed. Summary is written for people who have already read the whole thing.

Steps for writing a summary.

1. Identify the main idea.
2. Decide what you are going to leave out. Include the most essential details.
3. At the beginning include some sentences stating the subject matter of the summary, where the original text came from, and the original author's name.
4. State the author's opinion and not your own.
5. Make sure your verb tenses are appropriate.
6. Make the summary short, not more than 1/3 of the original text.

Guidelines for writing a summary.

1. Read the whole original text quickly to gain an impression of the content and its

relevance to your work.
2. Highlight the main points in every paragraph as you read.
3. Make notes of your own on these points.
4. Put away the original and rewrite your notes in your own words in complete sentences.
5. Begin your summary with the statement of the main idea at the start.
6. Using your notes write out supporting points in well-connected sentences.
7. Reread your work to check that you have concluded all the information than you need.

Pattern for writing a summary.

Definition

The main idea is…..(to+V); according to the writer, a_____is.

Description

According to the writer, a___has (characteristics).

Classification

(Two) types of_____were discussed in the lecture.

Chronology

The writer explained the sequence of events for_____.

Comparison

The writer compared_____with_____.

Contrast

The writer contrasted_____with_____.

Cause and effect

The writer explains why_____.

Problem and Solution

The writer presents several solutions for the problem of._____.

Abstract	Summary	Annotation
Is a shortened version of the paper written for people who never read the full version.	Restates the main findings and conclusions of a paper and is written for people who have already read the whole thing.	What is it about; goals.

Conference Proceedings

Conference proceedings are the publications of papers presented at a conference. A conference may require that papers missing the publication deadline for the proceedings cannot be presented at the conference. Proceedings usually contain four kinds of information:

- purpose or rationale of study (why they did it)
- methodology (how they did it)

• results (what they found)

• conclusion (what it means) It is not easy to include all the information in just a few words.

Start by writing a summary that includes whatever you think is important, and then gradually prune it down to size by removing unnecessary words, while retaining the necessary concepts. Some rules:

- Scientific writing must be accurate. Although writing instructors may tell you not to use the same word twice in a sentence, it is okay for scientific writing.
- Make sure you say what you mean.
- Be careful with commonly confused words.

For example: *Temperature has an effect on the reaction. ≠ Temperature affects the reaction.*

I used solutions in various concentrations. ≠ I used solutions in varying concentrations.

Less food (can't count numbers of food), but: Fewer animals (can count animals) A large amount of food (can't count them), but: A large number of animals.

The erythrocytes, which are in the blood, contain hemoglobin. ≠ The erythrocytes that are in the blood contain hemoglobin. (Wrong. This sentence implies that there are erythrocytes elsewhere that don't contain hemoglobin.)

- Write in a formal style, but at a level appropriate for your audience.
- Use verbs instead of abstract nouns (Instead of: take into consideration – Write: consider)
- Use strong verbs instead of 'to be' (Instead of: The enzyme was found to be the active agent in catalyzing... – Write: The enzyme catalyzed...)
- Use short words and short sentences. A sentence made of more than 40 words should probably be rewritten as two sentences.
- Check your grammar, spelling and punctuation. Use a spellchecker, but be aware that they do not catch all mistakes. Don't use commas.

SELF-ASSESSMENT

1. What is the typical order of sections in an academic paper?
   a) Introduction, methods, results, discussion, conclusion, references
   b) Introduction, literature review, methods, results, discussion, conclusion, references
   c) Introduction, background, methods, results, discussion, conclusion, references
2. What is the purpose of the introduction section in an academic paper?
   a) To provide a summary of the methods used in the study
   b) To discuss the significance of the research
   c) To present the results of the study
3. What is the literature review section of an academic paper?
   a) A summary of the data collected during the study

b) A discussion of the methods used in the study
c) A review of the relevant research and theories related to the study

4. What is the purpose of the results section in an academic paper?
a) To discuss the implications of the research
b) To present the data collected during the study
c) To provide a summary of the research question and methods used

5. What is the conclusion section of an academic paper?
a) A summary of the study's results and their implications
b) A discussion of potential future research
c) An explanation of the methods used in the study

PRACTICAL PART

1. Answer the questions:

1. What do you mean the word “annotation”?
2. What does the concise annotation?
3. What types of annotation do you know?
4. What stages of annotation do you know?
5. What is the recommended volume of annotation?

2. Read the annotation, entitle it, and write the key words.

This paper examines the integration of sustainable construction practices to enhance energy efficiency in modern urban infrastructure. It highlights the significance of adopting green building materials and technologies to address environmental challenges and reduce carbon footprints in the construction sector. The study provides a detailed analysis of energy-efficient designs, focusing on passive and active systems, such as advanced insulation, natural ventilation, and renewable energy integration. Case studies of urban development projects are presented, showcasing the application of sustainable strategies and their economic and ecological benefits.

The authors emphasize the role of international standards and building codes, including the Eurocodes, in promoting energy-efficient practices. They also discuss the challenges associated with implementing these standards, such as increased costs, limited material availability, and the need for specialized skills. A comparative analysis of traditional versus sustainable construction methods highlights the long-term advantages of adopting innovative approaches.

The paper concludes that transitioning to sustainable construction is essential for mitigating climate change impacts and achieving global energy targets. It calls for collaborative efforts between policymakers, industry stakeholders, and researchers to advance sustainability in construction. The findings contribute to the body of knowledge by providing practical recommendations for integrating sustainable solutions into construction processes.

3. Read an abstract and find the stylistic, lexical mistakes in it:

Building sustainable cities starts with innovative construction practices. This study dives into how modern materials and energy-efficient designs are shaping

urban infrastructure. Think solar panels, green roofs, and clever ventilation systems—they're not just good for the planet but also for cutting energy bills. By examining real-life projects, the research shows how these ideas work in practice, offering clear benefits for the environment and the economy.

But it's not all smooth sailing. There are hurdles, like higher costs, finding the right materials, and the need for workers with specialized skills. The role of building codes, like the Eurocodes, is explored to see how they help or hinder the process.

In the end, the study makes a case for teamwork. Policymakers, builders, and researchers all need to collaborate to make these ideas a reality. It's about building smarter today for a greener tomorrow.

4. Write an abstract to any English paper related to construction (200 words)
5. Find any Ukrainian article in your field and write an abstract in English based on the given sample (also see Appendix)

1. The article (paper, book, etc.) deals with…	1. Ця стаття (робота, книга тощо) стосується…
2. As the title implies the article describes…	2. Згідно з назвою, у статті розглядається…
3. It is specially noted…	3. Особливо варто відмітити…
4. Basic information on … is presented.	4. Надається основна інформація про …
5. The text gives a valuable information on…	5. Текст надає цінну інформацію щодо …
6. The paper consists of …parts (chapters). The paper contains the following parts: ……	6. Робота складається з … частин (розділів). Робота складається з наступних частин:…
7. The article is of great help to …	7. Ця стаття стане у нагоді…
8. The article is of interest to…	8. Ця стаття становить інтерес для…
9. It (the article) gives a detailed analysis of …, contains the data on…	9. Стаття дає детальний аналіз…, містить дані про…
10. Special attention is given (paid) to…	10. Особлива увага приділяється…
11. It should be stressed (emphasized) that…	11. Варто зазначити (підкреслити), що …
12. The method proposed …	12. Запропонований метод...

UNIT 6. WRITING PRESENTATIONS
THEORETICAL PART

Read and check your understanding.

Here are some tips on how to make a proper presentation:

Know your audience: Before creating your presentation, you should consider who your audience is, what their interests are, and what they hope to learn from your presentation. This will help you tailor your presentation to meet their needs.

Set clear goals: Determine what you want to achieve with your presentation and set clear goals. This will help you focus your presentation and ensure that your message is clear and concise.

Use a clear structure: Organize your presentation into a clear structure, using headings and subheadings to group related information together. This will help your audience follow your message and understand the key points.

Use visuals: Use visuals such as images, charts, and graphs to help illustrate your points and make your presentation more engaging. Ensure that your visuals are high-quality and relevant to your message.

Practice your delivery: Practice delivering your presentation multiple times to become familiar with the content and build your confidence. Time yourself to make sure you stay within the allotted time frame.

Engage your audience: Engage your audience with interactive elements such as questions, polls, or group discussions. This will help keep their attention and make your presentation more memorable.

Collect feedback: After your presentation, collect feedback from your audience to improve your future presentations. Consider what worked well and what could be improved upon for next time.

Useful phrases for presentations:

Introduction

- Good morning/afternoon everyone and welcome to my presentation. First of all, let me thank you all for coming here today.
- Let me start by saying a few words about my own background.
- As you can see on the screen, our topic today is.....
- My talk is particularly relevant to those of you who....
- This talk is designed to act as a **springboard** for discussion.
- This morning/ afternoon I'm going to take a look at the recent developments in...

Presentation structure

- In my presentation I'll focus on three major issues.
- This presentation is structured as follows....
- The subject can be looked at under the following headings.....

- We can break this area down into the following fields....

Timing

- It will take about X minutes to cover these issues.

Handouts

- Does everybody have a **handout** / copy of my report?
- I'll be handing out copies of the slides at the end of my talk.
- I can email the PowerPoint presentation to anyone who would like it.
- Don't worry about taking notes, I've put all the relevant statistics on a **handout** for you

Questions

- If you have any questions, I am happy to answer them
- If you don't mind, I'd like to leave questions until the end of my talk /there will be time for a **Q&A** session at the end...

Sequencing phrases

- My first point concerns...
- First of all, I'd like to give you an overview of....
- Next, I'll focus on.....and then we'll consider....
- Then I'll go on to highlight what I see as the main points of....
- Finally, I'd like to address the problem of.....
- Finally, I'd like to raise briefly the issue of....

Highlighting information

- I'd like to put the situation into some kind of perspective
- I'd like to discuss in more depth the implications of....
- I'd like to make more detailed recommendations regarding....
- I'd like you to think about the significance of this figure here
- Whichever way you look at it, the underlying trend is clear

Conclusion

- I'd just like to finish with the words of a famous scientist/ politician/ author.....
- Now let's go out and create opportunities for...!

SELF-ASSESSMENT

1) What is the purpose of a presentation?
   a) To inform or persuade an audience

b) To entertain an audience
c) To sell a product or service

2) What are the key elements of a successful presentation?
a) Clear and concise message, engaging visuals, and effective delivery
b) Complex and technical information, large amounts of text, and monotone delivery c) Humorous anecdotes, flashy animations, and excessive use of jargon

3) What is the recommended amount of text on a slide?
a) 5-7 words
b) 10-12 words
c) As many words as necessary to convey the message

4) What is the rule of thirds in slide design?
a) Dividing the slide into three equal parts horizontally and vertically
b) Placing important elements on or near the intersecting points of imaginary lines dividing the slide into thirds
c) Using three different font styles or sizes on each slide

5) What is the recommended font size for text on slides?
a) 12-14 points
b) 16-18 points
c) 20-22 points

6) What is the recommended length of a presentation?
a) 30-45 minutes
b) 60-90 minutes
c) As long as necessary to convey the message

7) What are some common presentation delivery techniques?
a) Using a conversational tone, maintaining eye contact with the audience, and using gestures to emphasize key points
b) Speaking in a monotone voice, reading directly from the slides, and avoiding eye contact with the audience
c) Speaking loudly and quickly, using slang or profanity to engage the audience, and pacing back and forth across the stage

8) What is the purpose of rehearsing a presentation?
a) To ensure a smooth and confident delivery
b) To memorize the entire presentation word-for-word
c) To save time and avoid making changes to the presentation

9) What is the recommended format for presenting numerical data?
a) Using graphs or charts to visualize the data
b) Presenting the data in a table format
c) Describing the data in detail using text

10) What is the recommended way to end a presentation?
a) Summarizing the main points and leaving the audience with a memorable message
b) Abruptly ending the presentation without a conclusion
c) Repeating the introduction and thanking the audience for their time

PRACTICAL PART

I.Preparation

Before reading study the following vocabulary:
Degradation
Overruns
Streamline
Simulations
Hazardous
Resilience
Maintenance
Affordable
HVAC
Pre-fabricated
Shortages

II. Reading Text

Construction Market Trends

The construction industry is constantly evolving, shaped by economic, technological, environmental, and social factors. Understanding the latest market trends is essential for businesses, professionals, and stakeholders to stay competitive and navigate the changing landscape. Below are some of the most notable trends in the construction market today:

1. Sustainability and Green Building

Sustainability has become a dominant focus in the construction industry, driven by growing concerns over climate change and environmental degradation. Green building practices, such as energy-efficient designs, the use of sustainable materials, and waste reduction strategies, are increasingly incorporated into construction projects. The demand for eco-friendly buildings is expected to rise, with more governments and organizations setting stringent regulations to limit carbon footprints. Technologies like solar panels, geothermal systems, and energy-efficient HVAC units are now standard in many new builds.

2. Building Information Modeling (BIM)

Building Information Modeling (BIM) has revolutionized the way construction projects are planned, designed, and executed. BIM allows for the creation of digital representations of physical structures, helping to improve collaboration, reduce errors, and streamline project management. By providing real-time data and

enabling simulations, BIM enhances efficiency, accuracy, and cost-effectiveness. This technology is gaining widespread adoption, with its use becoming a key differentiator for companies looking to stay ahead in the competitive construction market.

3. Modular and Prefabricated Construction

Modular and prefabricated construction are becoming increasingly popular as solutions to address issues like labor shortages, cost overruns, and project delays. Prefabricated components are built off-site and then assembled on-site, which significantly reduces construction time and increases quality control. This method is particularly beneficial in housing construction, where demand for quick, affordable homes is high. Additionally, modular construction allows for flexibility, as units can be customized and expanded easily.

4. Smart Construction and Automation

The integration of smart technologies into construction is another trend transforming the market. Smart buildings equipped with IoT (Internet of Things) sensors enable greater control over energy consumption, security, and maintenance. Automated machinery, robotics, and drones are also becoming more common on construction sites, improving productivity, safety, and efficiency. Drones, for example, are used for surveying and monitoring construction sites, while robotics can perform repetitive or hazardous tasks, reducing the risk of worker injuries.

5. Digitalization and Software Solutions

The digitization of construction processes is another key trend. The use of construction management software, cloud-based platforms, and mobile applications enables real-time communication, better project tracking, and more efficient workflow management. This helps construction companies to manage projects more effectively, reduce delays, and keep costs within budget. Additionally, the rise of data analytics and AI (artificial intelligence) is enabling companies to make better decisions by predicting project outcomes, optimizing resource allocation, and identifying potential risks early on.

6. Labor Shortages and Workforce Transformation

One of the ongoing challenges in the construction industry is the shortage of skilled labor. As baby boomers retire and fewer young workers enter the field, companies face difficulties in finding qualified employees. This has led to an increased focus on workforce development and training programs. The industry is also looking to attract a more diverse workforce by promoting inclusive hiring practices. Additionally, companies are embracing automation and digital tools to compensate for labor shortages and reduce dependence on manual labor.

7. Urbanization and Infrastructure Development

As the global population continues to grow, urbanization is creating a significant demand for new infrastructure, including roads, bridges, schools, hospitals, and transportation systems. Emerging markets, especially in Asia, Africa, and Latin America, are witnessing rapid urbanization, which drives demand for construction services. Governments are investing heavily in infrastructure projects to support economic development, creating a robust pipeline of work for construction companies worldwide.

8. Resilient and Disaster-Resistant Construction

With the increase in natural disasters, such as floods, earthquakes, and hurricanes, there is a growing emphasis on building resilience into structures. Construction companies are developing methods to design and construct buildings that can withstand extreme weather conditions and natural calamities. This trend is particularly strong in regions prone to disasters, where resilient infrastructure can save lives, protect property, and reduce repair costs in the long term.

9. 3D Printing in Construction

3D printing, or additive manufacturing, is making its way into construction as a way to reduce costs and improve efficiency. Using 3D printing, contractors can produce building materials and even entire structures with fewer resources and less waste. This technology has the potential to revolutionize the way buildings are constructed, offering faster timelines, lower labor costs, and more creative, custom designs.

✍ After-text exercises

1. Answer the questions:

1) What role does Building Information Modeling (BIM) play in improving the efficiency of construction projects?
2) How are modular and prefabricated construction methods helping to address challenges like cost overruns and labor shortages?
3) In what ways is automation and smart construction technology transforming construction sites?
4) What impact does urbanization have on the demand for construction services, particularly in emerging markets?
5) How are advancements like 3D printing changing the way buildings and materials are constructed?

2. **Creating presentations**. Identify the key components of the presentation, such as the introduction, market segmentation analysis, impact of digitalization, future directions, and conclusion. Create 10-12 presentation slides with detailed content for each section, incorporating text, images, and data visualizations as needed.

    1. **Choose a Trend**: Select one of the following construction market trends to focus on:
        - Sustainability and Green Building
        - Building Information Modeling (BIM)
        - Modular and Prefabricated Construction
        - Smart Construction and Automation
        - 3D Printing in Construction
    2. **Research**:
        - Conduct further research to support your understanding of the chosen trend. Find real-life examples or case studies where this trend has been applied.
        - Focus on how the trend is impacting the construction industry, its future potential, and any challenges that may arise.
    3. **Create the Presentation**:
        - Use visual aids (PowerPoint, Prezi, or any other preferred software) to create your presentation.
        - Include:
            - A brief introduction to the trend.
            - Benefits and advantages for the construction industry.
            - Current applications or examples in the market.
            - Potential challenges or issues related to the trend.
            - Predictions for the future of this trend in construction.
    4. **Present**:
        - Present your findings to the class (5-10 minutes).
        - Ensure your presentation is clear, well-structured, and engaging.
        - Be ready to answer questions from your peers regarding your chosen trend.

Evaluation Criteria:

- **Content**: Accuracy of the information presented.
- **Clarity**: Clear explanation of the trend and its significance.
- **Visual Aids**: Use of relevant and effective visuals to support the presentation.
- **Engagement**: Ability to engage the audience and answer questions effectively.

UNIT 7. WRITING QUALIFICATION PAPER SUMMARY

THEORETICAL PART

 ***Read and check your understanding.***

Qualification Paper is an independent study of a specific scientific or artistic issue or an artistic accomplishment illustrating the student's general knowledge and skills related to a particular field of study, the level and profile of education, and the ability to carry out an independent analysis and formulate conclusions.

The Qualification Paper should demonstrate the following from the student concerning the field of study:

• Awareness and understanding of important current work in the field; • Ability to plan a research activity;

• Knowledge and motivation to carry out the planned research activity;

• Ability to analyze the results of the research;

• Ability to draw reasonable conclusions from the research;

• Ability to complete a written description of the work in the form of a well-written, properly organized thesis;

• Ability to complete a thesis with potential for presentation at and/or participation in professional meetings and/or publication in scholarly journals.

Qualification Paper should have the following structure:

– title page;

– summary;

– contents;

– introduction;

– list of abbreviations and symbols (if necessary);

– chapters of the main body (not less than two);

– conclusions;

– bibliographic reference list;

– appendices (if necessary)

The summary is a key part of your thesis and part of what is evaluated by your thesis committee. Make sure to reserve sufficient time at the very end to write a very good summary. The summary should be about one page long and include your research question, describe the data you used, briefly describe the methodology applied and (very important) also summarize the results you found. Summary elements:

Purpose: should start by describing the main purpose or aim of the research.

Methods: as a second point, the methodology carried out should be explained.

Results: a concise summary of the results should be included.

Conclusion: a short outline of the general outcome of the research should be given.

Keywords: specific words and phrases related to the topics discussed in the research should be added. These words are usually around five, but the number can vary depending on the journal's guidelines.

PRACTICAL PART

1. Read a summary and answer the questions:

Title: "Optimizing Efficiency in Construction: A Comprehensive Analysis"

This thesis delves into the intricacies of construction with a focus on optimizing efficiency in construction processes. Through a rigorous examination of industry practices, the research identifies key challenges and opportunities for improvement. Utilizing a combination of theoretical frameworks and empirical analysis, the study investigates the impact of various factors on productivity, quality, and cost-effectiveness. Results reveal insights into the effectiveness of different strategies and technologies, shedding light on best practices for enhancing overall efficiency in building operations. By addressing these findings, industry stakeholders can make informed decisions to streamline processes, reduce waste, and maximize output. The conclusion highlights the importance of continuous improvement and adaptation to meet evolving demands in the competitive landscape of building.

1. Does the summary clearly outline the main purpose or aim of the research in building industry?
2. Does the summary provide concise results or conclusions of the research?
3. Are there specific keywords related to building topics included in the summary?
4. Is there an appropriate balance between description and analysis in the summary?
5. Does the summary adhere to the necessary elements of a thesis summary, such as purpose, methods, results, and conclusion?

2. Read a summary and answer the same questions:

Title: "Enhancing Sustainability in Construction: Innovations and Challenges"

Purpose: The primary objective of this research is to explore strategies for enhancing sustainability within construction industry. This includes investigating innovative technologies, processes, and practices aimed at reducing environmental impact, optimizing resource utilization, and promoting social responsibility.

Methods: The research methodology involves a comprehensive review of literature, case studies, and industry reports related to sustainable practices in construction. Additionally, empirical analysis and case studies are conducted to examine the effectiveness of various sustainability initiatives implemented by machine building companies.

Results: The findings of this research highlight the importance of adopting sustainable practices in building, including the use of renewable materials, and waste reduction strategies. Furthermore, the study identifies key challenges and barriers to achieving sustainability goals in the industry.

Conclusion: In conclusion, this research underscores the critical role of sustainability in building sector and provides insights into effective strategies for promoting environmental stewardship and social responsibility. By embracing

sustainable practices, machine building companies can enhance their competitiveness, mitigate risks, and contribute to a more sustainable future.

Keywords: Sustainability, building, environmental impact, resource utilization, social responsibility, renewable materials, energy efficiency, waste reduction, sustainable practices.

3. Make a glossary of terms related to your research topic.

Term	Description	Ukrainian equivalent

4. Speaking.

Conduct a comprehensive review of academic papers relevant to your research topic in construction industry. The purpose of this assignment is to deepen your understanding of existing literature, identify key trends, gaps, and controversies in the field, and synthesize findings to inform your own research project.

Review and Analyze Papers: Read and critically evaluate the selected papers, focusing on their relevance, quality, and contribution to the field. Pay attention to key concepts, methodologies, findings, and conclusions presented in each paper. Highlight important insights, strengths, and limitations of the research.

5. Write a summary to your qualification paper (purpose, methods, results, conclusion, keywords).

CHAPTER 3. CONSTRUCTION MATERIALS

UNIT 8. TYPICAL CONSTRUCTION MATERIALS

THEORETICAL PART
EDITING OF MACHINE TRANSLATION

Read and check your understanding.

When a computer rather than a human performs an initial translation, editing and proofreading are crucial for revising and improving the text. Machine translation engines like Google and Bing are much better than they used to be, but they still produce inaccurate or confusing phrases, so an expert (who is often a translator trained in editing techniques) needs to edit the text to remove errors and correct word choice. This specific type of translation editing and proofreading is called machine translation post-editing, and it focuses on errors unique to machine-generated results.

Proofreaders work with almost-finalized drafts and cover the following topics:
major grammar mistakes
spelling and punctuation
word choice inconsistencies
typos and cut-and-paste errors
formatting problems

Handy tips:

1) Get rid of words that do not contribute to the meaning of a sentence, or words that over-complicate the structure.

   Good example: He works on marketing projects.

   Bad example: He is the man who works on marketing projects.

2) Keep your sentences short, with a simple grammatical structure. Where possible, break long sentences into two shorter ones
3) Avoid ambiguity, use the active voice

The active voice is a style of writing that cuts out vagueness and ambiguity. Again, if a human is unsure on the exact meaning of a phrase, then a machine translation engine is going to struggle, especially if your sentence has a double meaning.

Good example: I will always remember my first time using a machine translation engine.

Bad example: My first time using a machine translation engine will always be remembered.

4) Use the definite article, even when you don't want to

Try to specify nouns using "the", as a machine translation engine can struggle to distinguish between verbs and nouns. A lot of short nouns can also be verbs, for example 'skip', 'bank', 'lodge' – these can cause further confusion if used without a definite article. Instructions and user manuals often omit the definite article.

Good example: Build the engine. Train the engine. Use the engine.

Bad example: Build engine. Train engine. Use engine.

5) Avoid idioms/clichés/slang/colloquialisms/abbreviations

A machine translation engine may not convey the correct meaning of colloquial or idiomatic phrases and the meaning may not make sense to international users.

Good example: She didn't come into the office as she was not feeling well.

Bad example: She didn't come into the office as she was under the weather.

5) Avoid the preposition – of more than three times within a sentence. Instead, -of phrases convert into multicomponent terms.

SELF-ASSESSMENT

1. Which of the following is NOT a common error in machine translation?
   a) Missing words
   b) Incorrect verb tense
   c) Inconsistent terminology
   d) Perfect grammar and syntax
2. True or False: Machine translation is always 100% accurate.
   a) True
   b) False
3. Which of the following is a good strategy for proofreading machine translation?
   a) Reading the translation out loud
   b) Comparing the translation to the original text
   c) Using a spell-checker
   d) All of the above
4. Which of the following is NOT a benefit of machine translation?
   a) Speed
   b) Cost-effectiveness
   c) Accuracy
   d) Personalization
5. True or False: Machine translation is a replacement for human translators.
   a) True
   b) False

PRACTICAL PART

I.Preparation

Before reading study the following vocabulary:

Composite
Aggregate
Reinforced
Tensile
Purlins
Sustainable
Workability
Masonry
Insulation

II. Reading Text

Typical construction materials

A construction building material is any substance used in building a structure. There are various kinds of materials used for building in the construction industry. We use different materials depending on their structural capabilities. In different regions, local and national standards govern building materials in construction. On the other hand, architects choose construction materials based on aesthetics and cost. Picking the suitable material for your project means enhancing and lengthening a project's lifetime. Some of the most common construction materials are as discussed below.

1. Concrete

Concrete is one of the most common construction materials. According to the Royal Society of Chemistry, it is indeed the single most widely used material in the entire world. It is a composite material from fine and coarse aggregate mixed with a binder like cement and water. The mixture is then left to cure and set over time. Concrete takes seven days to cure and an average of 28 days to attain maximum strength. Reinforced concrete is most common in construction, whereby steel is embedded in the concrete to increase the structural tensile strength. Concrete comes in many forms, with examples such as lightweight concrete and waterproof concrete. The project type dictates the type of concrete used. One of the most significant advantages of concrete is that it can be poured into any shape and hardened into a stone-like material.

Because of its cost and versatility, concrete is a common material in construction. We use concrete for:

Foundations
Residential building construction
Commercial building construction
Bridge construction
Culverts and sewers.

2. Steel

The construction of skyscrapers exploded from our discovery of steel as a reinforcement material. Steel is a composite material made from alloys of iron and carbon. Steel has high strength and functionality. It is also lightweight, easy to work with, and cheaper to ship than other building materials. Steel does not easily deform unless we place a tremendous amount of weight on it, and it retains its structural properties even when it is bent. Due to its structural stability, we use steel to make tall modern buildings' structural frameworks.

Steel has distinguishing qualities such as high strength to weight ratio. It is less time-consuming to install than concrete, and we can install it in any environment. If not correctly installed, however, steel is susceptible to corrosion. One of the significant drawbacks of steel as a construction material is that it is likely to break down during high-temperature levels. Its level of fire resistance depends on the type of steel.

We commonly use steel is in construction for the following purposes:

For structural sections: We use steel as reinforcing bars to increase the tensile strength of structures.

Roofing: We use steel to make roofing products such as purlins, internal walls, ceilings, and cladding.

Internal fixtures: We use it to make interior fittings such as rails and stairs.

Utilities: We construct underground water, fuel, power, and gas lines using steel.

3. Wood

Wood is arguably the oldest construction material as it has been in use. It is naturally available and cost-efficient, strong and durable, and flexible in all senses. It can be bent, molded, or cured into desirable shapes. Other than its durability, wood is an environmentally sustainable material. We can use wood for commercial and residential buildings, and it works well with other materials. It functionally works well with steel, marble, and aluminum. Compared to other construction materials, wood is relatively light and easy to standardize in size. It has high tensile strength and is good in soundproofing and insulation.

We use wood in construction in the following areas:

Construction of walls, floors, and ceilings

Construction of interiors such as door and window frames

Frames of structures in buildings and bridges

Thermal insulation

Acoustic insulation

4. Stone

Stone is the longest-lasting building material. The most ancient buildings in the world are made of stone. We commonly use stone in walls and floorings, and the texture makes it versatile. Stone comes with smooth finish textures to rough ones and also comes in many different colors. Examples of stones used in construction are sandstone, granite, and marble. Ordinary stone is cheap, but the prices go up for unique finishes. For marble countertops, quality and color increase the production time and cost.

Stone has a few drawbacks. Its density affects its workability due to its weight, thus making it difficult to move it. Stone is also a terrible insulator therefore ineffective for insulation in cold environments.

We use stone in construction in the following aspects:

As rough aggregate in construction

In masonry works for walls, dams, and bridge piers

As ballast for railways

For damp proofing of external walls

Stones like marble are used for making excellent polish finishes.

5. Brick / Masonry

Masonry uses bricks which are rectangular blocks, and they are later bound with mortar. Bricks were traditionally made from heated and dry clay. They have a high compression resistance, but they can break easily. The most vital bricks in existence now are concrete blocks which are reinforced using steel. Masonry is fire-resistant and durable. Due to its high compressive strength, we use it to construct load-bearing

walls. Masonry can support multi-story buildings when reinforced with concrete, thus providing an economical building choice.
Masonry is used in various construction components such as:
Used for walls
Used for masonry foundations
Other types, such as veneer masonry, are used for decorating finishes.
Masonry is also used for gabion construction in flood-prone areas.

- 

From: https://www.autodesk.com/blogs/construction/common-construction-materials/

✍ **After-text exercises**

1. Do a comprehension quiz:

1.Which of the following is the most common material used in construction?
a) Steel
b) Concrete
c) Wood
d) Stone
2. How long does concrete typically take to attain its maximum strength?
a) 7 days
b) 14 days
c) 28 days
d) 56 days
3. What is a major disadvantage of steel as a construction material?
a) High cost
b) Vulnerability to corrosion
c) Heavy weight
d) Poor insulation properties
4. Which of the following is NOT a typical use for steel in construction?
a) Roofing
b) Utilities (water, power lines)

c) Flooring
d) Structural framework of tall buildings
5. What is a key advantage of using wood in construction?
a) It is fireproof
b) It is an environmentally sustainable material
c) It is highly resistant to corrosion
d) It is non-combustible
6. What is one of the primary drawbacks of using stone in construction?
a) It is expensive
b) It has low tensile strength
c) Its weight makes it difficult to work with
d) It is prone to corrosion
7. Which of the following is NOT a typical use for wood in construction?
a) Thermal insulation
b) Framing of walls and floors
c) Reinforcing concrete
d) Acoustic insulation
8. What is the main function of reinforced concrete in construction?
a) To increase the structural tensile strength by embedding steel
b) To reduce the curing time of concrete
c) To provide insulation
d) To make the concrete lightweight
9. Which of the following is a type of stone commonly used in construction?
a) Sandstone
b) Brick
c) Cement
d) Limestone
10. Which material is commonly used in masonry for creating walls and foundations?
a) Steel
b) Wood
c) Concrete blocks
d) Plastic

2.Answer the questions:

1) What are the primary components of concrete, and how is it made?
2) Explain the role of steel in construction and why it is often preferred for building tall structures.
3) Describe the advantages of using wood as a construction material. In what types of buildings is it most commonly used?
4) What are some of the drawbacks of using stone in construction, and how can these issues be addressed?
5) How is reinforced concrete different from regular concrete, and why is it important in structural applications?

6) What are the main uses of brick or masonry in construction, and why is it considered an economical choice for building?

3. True/false:

1) Concrete takes 7 days to cure to its maximum strength.
2) Steel is lightweight, easy to work with, and resistant to deformation unless subjected to extreme weight.
3) Wood is a poor material for thermal insulation and soundproofing in construction.
4) Stone is an excellent insulator and is commonly used for insulation purposes in cold climates.
5) Masonry is commonly used for non-load-bearing walls and decorative finishes.
6) Concrete is the most widely used construction material in the world.
7) Reinforced concrete is made by embedding steel into concrete to improve its tensile strength.

4. Match the terms with their definitions:

Words	Definitions
1. Stone	a) A durable material made from heated and dried clay, used for walls.
2. Masonry	b) A material used to prevent the transfer of heat or sound in buildings.
3. Concrete	c) A composite material that sets over time, often used for foundations.
4. Reinforced concrete	d) A natural material commonly used in construction for framing and insulation.
5. Steel	e) The process of creating structures from bricks or stone blocks.
6. Wood	f) A construction material formed by embedding steel into concrete to increase its strength.
7. Brick	g) A type of stone used for decorative finishes in buildings.
8. Insulation	h) A material made from iron and carbon used in construction.

5. Video: watch a video about natural and artificial construction materials (https://www.youtube.com/watch?v=XsFeVuVQE-E&ab_channel=MobileTutor). Write down the examples of materials, its advantages and disadvantages.

6. Analyze the Google translation of Master's thesis titles and edit them

Title	Google Translate	Proofreading

7. **Role play. Two construction professionals, Alex and Jamie, are discussing materials for a new building project. Fill in the blanks with the correct words**
   - So, Jamie, for the foundation of this new project, what do you think would be the best material to use?
   - **Jamie:**
     I think we should go with _____ (1). It's durable, sets over time, and is very commonly used for foundations. Plus, it's cost-effective.
   - **Alex:**
     That sounds good, but for the structural framework, we might need something with more tensile strength. What about _____ (2)? It's lightweight, easy to work with, and has a high strength-to-weight ratio.
   - **Jamie:**
     Great idea! We can also use _____ (3) for the walls. It's been a go-to material for centuries and can add a really aesthetic touch to the building. Plus, it's strong and provides good insulation.
   - **Alex:**
     Definitely, but we should also consider _____ (4) for the roofing. It's fire-resistant, and we can easily mold it into different shapes. It's also environmentally sustainable, so it's a great choice.
   - **Jamie:**
     I agree, and for the internal partitions, maybe we could use _____ (5)? It's durable and easy to install, and it would give us the flexibility to adjust the layout as needed.

6. **Make a presentation on other construction materials not mentiones in the text.**

UNIT 9. SELECTING CONSTRUCTION MATERIALS

THERETICAL PART
GRAMMAR PECULIARITIES OF TECHNICAL TEXTS

Read and check your understanding.

Technical texts have their own set of grammar peculiarities that distinguish them from other types of texts. Some of these peculiarities include:

Passive voice: Technical texts tend to use the passive voice more often than other types of texts. This is because technical writing is often focused on processes and procedures rather than on people or actions. E.g. "The experiment was conducted under controlled conditions to ensure accuracy."

Gerund. The gerund is a verb form that functions as a noun and is created by adding "ing" to the base form of the verb. In technical texts, gerunds are commonly used to describe ongoing actions, processes, or activities. E.g. "The software automates the process of converting raw data into visualizations." Gerunds can also be used to describe actions that are happening simultaneously. For example, "The machine is constantly monitoring the temperature and adjusting accordingly" uses "monitoring" as a gerund to describe an action that is happening simultaneously with the action of adjusting the temperature.

Additionally, gerunds can be used to create lists of actions or to group similar actions together. For example, "The design process includes researching customer needs, creating prototypes, and testing functionality" uses gerunds to group together the various actions involved in the design process.

Present tense: Technical texts often use the present tense to describe processes and procedures that are ongoing or repeated.

Specialized vocabulary: Technical texts rely heavily on specialized vocabulary, which may include technical terms, acronyms, and jargon. These terms may not be familiar to the general reader, but are necessary for communicating technical information effectively.

Sentence structure: Technical texts tend to use longer and more complex sentences than other types of texts. This is because technical writing often requires precise and detailed explanations of complex concepts.

Abbreviations: Technical texts often use abbreviations to save space and simplify language. However, it's important to define abbreviations when they are first introduced to ensure that readers understand their meaning. *CTS - coolant through spindle, HRSG - Heat Recovery Steam Generator, LHV - Lower Heating Value, NGCC - Natural Gas Combined Cycle, O&M - Operations and Maintenance, PC - Pulverized Coal, SCR - Selective Catalytic Reduction, ST - Steam Turbine, CAM - computer-aided manufacturing, VOC - Volatile Organic Compounds, ATC - automated tool changer*

Numerical information: Technical texts often contain numerical information, which must be presented clearly and accurately. This may include measurements,

statistics, and other quantitative data. Here are some common numerical terms and measurements used in heat power terminology: *BTU - British Thermal Unit - A measure of heat energy equivalent to the amount of energy needed to raise the temperature of one pound of water by one degree Fahrenheit; MW - Megawatt - A unit of power equal to one million watts; GJ - Gigajoule - A unit of energy equivalent to one billion joules; kg/s - Kilograms per second - A unit of mass flow rate, commonly used to express the flow rate of fluids or gases, % - Percent - A unit of proportion, equal to one part in 100; Efficiency - A measure of how much of the input energy is converted into useful output energy, expressed as a percentage; Heat rate - The amount of heat energy required to generate one unit of electricity, typically measured in BTUs per kilowatt-hour (BTU/kWh), Pressure - The force exerted per unit area, commonly measured in pounds per square inch (psi) or kilopascals (kPa); Temperature - The degree of hotness or coldness of a substance, commonly measured in degrees Celsius (°C) or Fahrenheit (°F), Flow rate - The amount of fluid or gas that passes through a given area in a given amount of time, commonly measured in cubic meters per second (m^3/s) or cubic feet per minute (CFM).*

Standardized formats: Technical texts may follow standardized formats, such as the format for a scientific research paper or the format for an engineering report. These formats help to organize information and make it easier to understand.

SELF-ASSESSMENT

1) Which sentence is correctly written in passive voice?
   a) The company designs new products every year.
   b) New products are designed by the company every year.
2) Which sentence is correct?
   a) You can improve performance by updating the codebase
   b) You can improve performance to update the codebase
3) What statement is correct?
   a) Use slash notation in technical texts to express combined units. For example, "m/s" for meters per second
   b) Don’t use slash notation in technical texts to express combined units. For example, "m/s" for meters per second
4) What sentence is correct:
   a) A process can be improved by changing a technology.
   b) One can improve a process to change a technology.
5) Technical texts tend to use shorter sentences.
   a) true
   b) false

PRACTICAL PART

I.Preparation

Before reading study the following vocabulary:

Durability

Defects liability period
Environmental impact
Raw materials
Service life
Ecologically friendly
Waste issues
Lifecycle
Utility
Milestones

II.Reading a text

The importance of selecting the correct materials

Material selection is fundamental in any building project or renovation. Though most contractors already have a contract sum in mind, it is best to consider the suitability of materials in a project despite the cost. Below are some of the importance of selecting the right materials in a construction project.

1. The durability of the material

The durability of a material affects the defects liability period and the timeframe of warranty within the project. It is also best to ensure the durability of construction materials to ensure the stability of a structure. Durable construction materials won't need frequent repairs and replacements; therefore, one can distribute the raw materials, and environmental and energy impacts over time.

Sometimes buildings are modified for reasons that do not concern their structural integrity, and durability planning maps out a reasonable service life target of a building.

2. Cost of materials

The cost of materials is a vital discussion point between engineers, the client, and the architect. However, looking for the most affordable product without considering its lifespan and utility is not always desirable.

Correct building materials will serve you long-term and be more cost-effective in your project.

3. Environmental impact of a material

The choice of construction materials is primarily made on cost, structural, and thermal properties. However, building materials have environmental implications, such as pollution and energy consequences in the manufacturing processes.

Poor quality construction materials also increase waste issues throughout the stages of construction. Construction materials affect the lifecycle and recycling options during a project's expected life. If you have the option to select an ecologically friendly material that doesn't sacrifice quality, it is encouraged to apply it.

4. Better adherence to project milestones

Improper selection of materials can affect your material management system and sequence of construction activities. Quality materials will minimize the

required repairs and make it possible to deliver a project within the stipulated timelines.

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From: https://www.autodesk.com/blogs/construction/common-construction-materials/

✍ **After-reading exercises**

1. Do a comprehension quiz:

1. Why is the durability of construction materials important?

a) It affects the project's budget
b) It ensures the structural stability of the building over time
c) It improves the aesthetic value of the building
d) It makes the building less expensive to construct

2. What is the "defects liability period"?

a) The time frame when construction materials need to be repaired
b) The time frame when building permits are valid
c) The warranty period provided by the material manufacturer
d) The duration materials are guaranteed to be free from defects

3. What is a primary factor when selecting construction materials?

a) Durability
b) Color
c) Availability of contractors
d) Aesthetic appeal

4. Why is cost an important factor when selecting materials?

a) It determines the environmental impact
b) It affects the total project budget and long-term sustainability
c) It ensures the building is easy to build
d) It guarantees a shorter construction timeline

5. Which of the following is an environmental concern related to construction materials?

a) The color of the materials
b) The manufacturing energy consumption and pollution
c) The ease of delivery
d) The weather resistance

6. How can selecting poor-quality materials impact the construction process?
a) It can decrease the overall construction cost
b) It can lead to more repairs and delays, increasing waste
c) It can improve the environmental impact of the project
d) It can reduce the overall project lifespan
7. What does the term "service life" of a building refer to?
a) The length of time it takes to build the structure
b) The expected duration the building will be in use before major repairs are needed
c) The cost of maintaining the building over time
d) The number of workers required for construction
8. What is one advantage of using ecologically friendly materials in construction?
a) They are cheaper than traditional materials
b) They increase the structural strength of buildings
c) They reduce the environmental impact of the construction process
d) They shorten the construction timeline
9. What effect does the improper selection of materials have on a project?
a) It has no significant effect on the overall project
b) It can delay the project and affect the material management system
c) It guarantees the project will meet the deadline
d) It improves the structural quality of the building
10. Why is it important to consider the environmental impact when choosing materials?
a) To ensure the materials match the building's color scheme
b) To reduce pollution and minimize waste during construction
c) To increase the durability of the building
d) To make the building more attractive

2. Answer the questions:

1) What are the key factors to consider when selecting construction materials for a project?
2) How does the durability of materials influence the longevity of a building?
3) Why is it important to consider the environmental impact of construction materials?
4) How does the cost of materials affect the overall budget and success of a project?
5) What is meant by the "defects liability period," and how does it relate to material selection?
6) In what ways can the choice of materials affect the construction project timeline and milestones?
7) Why is it beneficial to select ecologically friendly materials for construction?

3. True/false:

1) Durable construction materials require frequent repairs and replacements.
2) The cost of materials is the most important factor to consider when selecting construction materials.
3) Choosing ecologically friendly materials can have a positive impact on the environment without sacrificing quality.
4) Improper selection of materials can delay a project and affect its milestones.
5) The environmental impact of materials only becomes relevant after the construction phase is completed.
6) A building's service life target is part of durability planning.
7) Materials with poor quality contribute to reduced waste throughout construction.

4. **Find examples of Passive and Gerund in a text.**

5. **Open the brackets and put the verb in the correct passive form.**

1. The foundation (pour) last week by the construction team.
2. The plans for the new building (approve) by the architect yesterday.
3. The steel beams (install) before the concrete floor is laid.
4. The project (complete) on schedule despite the weather delays.
5. The building (inspect) regularly to ensure it meets safety standards.
6. The permits for the construction (issue) by the local authorities.
7. The walls (construct) using reinforced concrete.
8. The crane (use) to lift the heavy materials to the upper floors.
9. The final inspection (conduct) next week to check the quality of the work.
10. The bricks for the wall (deliver) by truck earlier this morning.

6. **Speaking.** Imagine you are planning to build your future cottage. Choose the construction materials you would like to use for each part of your cottage (foundation, walls, roofing, etc.). Write a detailed description of your choice of materials and explain why you have selected them, considering factors like durability, cost, environmental impact, and aesthetic appeal.
7. **Role play.** Make up a dialogue between a client and construction expert:

- **Client:**

- You are planning to build a cottage and are looking for advice on the best materials for different parts of the house.
- You care about the cost, durability, and environmental impact of the materials.
- You want your cottage to be comfortable, functional, and aesthetically pleasing.

- **Construction Expert:**

- You are an experienced construction professional with knowledge of different building materials.
- You need to explain the pros and cons of different materials and help the client make decisions about the foundation, walls, roof, flooring, windows, and doors.
- You should consider the client's preferences and budget when recommending materials.

UNIT 10. INNOVATIVE CONSTRUCTION MATERIALS
THEORETICAL PART

MAKING CONTRACTS

Read and check your understanding.

A contract is a binding and enforceable legal agreement between two or more parties. Important features of every contract include:

Basic information: Legal names and/or business names of the involved parties, their addresses, and a description of the property or service being exchanged for money or other consideration.

Agreement: This is a statement of the terms of the contract, such as the rights and responsibilities of all involved parties. If the contract records a loan, this section might cover the payment terms.

Specific considerations: This is a more detailed description of the property and/or terms, like the condition of the item, what the parties will and will not be responsible for, and what, if any, warranty or guarantees exist.

Dates: Every agreement notes the date of sale, dates for any warranties in effect, and due dates for payment installments, if any.

Null and void: This section explains how the contract can be nullified if there is a breach of contract.

Writing a contract requires careful consideration of legal language and specific requirements. Here are some general steps to follow when writing a contract:

Identify the parties involved: Begin by identifying the parties involved in the contract, including their full legal names and addresses. This will ensure that the contract is binding and enforceable.

Define the terms and conditions: Clearly define the terms and conditions of the agreement. This includes the scope of work or services to be provided, payment terms, deadlines, and any other relevant details. Be sure to use clear and concise language.

Include legal language: Contracts typically include legal language, such as indemnification clauses, limitations of liability, and dispute resolution provisions. Consult with a lawyer to ensure that these clauses are appropriate and enforceable.

Include signatures and dates: Once the contract is complete, have all parties sign and date it. This ensures that everyone has agreed to the terms and conditions.

Keep a copy for your records: Be sure to keep a copy of the contract for your records. This can be important if any disputes arise in the future.

It's important to note that contract writing can be complex and vary based on the specific industry and legal requirements. It's recommended to consult with a lawyer or legal professional when drafting contracts to ensure that they are legally binding and enforceable.

Sample contract

Brighton, England **April 10, 2009**	**Брайтон, Англія** **10 квітня, 2009 р.**
Continental Equipment Plc, Brighton, England, hereinafter referred to as "the Seller", on the one part, and TST Systems Ltd., Kyiv, Ukraine, , hereinafter referred to as "the Buyer", on the other part, have concluded the present Contract as follows:	Компанія Continental Equipment Plc, Брайтон, Англія, яка надалі іменується „Продавець", з однієї сторони, і компанія ТСТ Системз Лтд.Ю Київ, Україна, яка надалі іменується „Покупець", з іншої сторони, уклали цей контракт про наступне:
I. *Subject of the Contract* 1.1. The Seller has sold and the Buyer has bought the machinery, equipment, materials, and services ("Equipment") as listed in Appendix 1 being an integral part of this Contract.	I. *Предмет Контракту* 1.1. Продавець продав, а Покупець купив машини, облад-нання, матеріали і послуги ("Обладнання"), перераховані у Додатку 1, який є невід'ємною частиною цього Контракту.
2. Prices and Total Value of the Contract 2.1. The Total Contract Value is as follows: Equipment and engineering FOB U.K. port + documentation £ ____ Supervision, start-up and training £ ____ Spare and wear parts £ ____ Freight £ ____ Total price CIF Odessa £ ____ Discount £ ____ Total Contract Value £ ____	2. *Ціни і загальна сума Контракту* 2.1. Загальна сума Контракту складає: Обладнання і техніка на умовах FOB (порт Великобританії) +документація £ ____ Супровід, запуск і підготовка персонал £ ____ Запасні і зношувані деталі £ ____ Фрахт судна £ ____ Загальна сума на умовах CIF Одеса £ ____ Знижка £ ____ Загальна сума Контракту £ ____
2.2. The prices are understood to be CIF Odessa including cost of packing, marking, loading on board a ship, stowing and fastening the equipment in the hold, and the cost of the materials used for this purpose.	2.2. Ціни розраховуються на умовах CIF Одеса, включаючи вартість упаковки, маркування, завантаження на борт судна, розміщення і кріплення в трюмі, а також вартість матеріалів, які використовуються для цієї мети.
2.3. The prices are firm for the duration of the Contract and shall not be subject to any revision except on account of any mutually agreed changes or modifications to equipment specification and/or quantities listed in Appendix 1 to this Contract.	2.3. Ціни залишаються незмінними протягом всього строку дії Контракту і можуть бути переглянуті лише у випадку взаємно погоджених змін у специфікації обладнання або його модифікації, а також змін кількості його складових частин, вказаних у Додатку 1 до цього Контракту.
3. Time of Delivery 3.1. The Equipment specified in Appendix 1 of the present Contract is to be delivered within two (2) months from the date of opening the Letter of Credit specified in Clause 4.1 of this Contract.	*3. Срок поставки* 3.1. Обладнання, перераховане у Додатку 1 до даного Контракту, повинно бути поставлене протягом двох (2) місяців з моменту відкриття акредитиву, вказаного у п.4.1 даного Контракту.
3.2. The delivery date is understood to be the date of the clean Bill of Lading issued in the name of the	3.2. Датою поставки Обладнання вважається дата видачі чистого коносамента із вказівкою імені Покупця

Buyer, destination Odessa, Ukraine.

4. Terms of Payment

4.3. Within thirty (30) days from the date of signing this Contract, the Buyer is to open in favour of the Seller an irrevocable confirmed Letter of Credit with CityBank, London, for hundred per cent (100%) of the total contract value. The Letter of Credit is to be valid for three (3) months.

4.2. Payment from this Letter of Credit at the rate of hundred per cent (100%) of the total contract value is to be effected in GB pounds against the following shipping documents:

4.2.1. Original Bill of Lading issued in the name of the Buyer, destination Odessa, Ukraine.

4.2.2. Shipping Specification.
4.2.3. Certificate of Quality.
4.2.4. Certificate of Origin.
4.2.5. Packing List.
4.2.6. Insurance Policy.

5. Technical Documentation

5.1. Within five (5) days from the delivery date the Seller shall send two (2) sets of the technical documents as listed in Appendix 2 to the address of the Buyer.

5.2. All instructions on the drawings are to be in English, with all the instructions contained in Items 1,2,3, and 4 of Appendix 2 translated into Ukrainian.

6. Guarantee of the Quality of the Equipment.

6.1. The guarantee period is twelve (12) months from the date of the start-up of the Equipment, that is reflected in an appropriate Act signed by the representatives of the Parties to the present Contract, but not more than eighteen (18) months from the date of delivery of the Equipment.

6.2. If the Equipment proves to he defective or faulty during the guarantee period, the Seller has at its expense at the choice of both Parties either to remedy the defects or to replace the faulty equipment with new equipment of good quality which is to be delivered without delay to the port of delivery.

7. Packing

7.1. The Equipment is to be shipped in export sea packing suitable for the type of equipment delivered. Packing should also be suitable for transshipment in transit and reasonable long storage of the Equipment.

7.2. Each container is not to exceed the following dimensions: length - 2,500 mm, width = 2,500 mm, height = 2,500 mm.

7.3. The Seller is responsible to the Buyer for any damage to the Equipment resulting from inadequate packing of the equipment.

8. Marking

8 1. Ail the containers are to be marked on three (3) sides. Each container should bear the following markings made in indelible paint (in Ukrainian and

і кінцевого порту призначення - Одеса, Україна.

4. Умови оплати

4.1. Протягом тридцяти (30) днів з моменту підписаній цього Контракту Покупець повинен відкрити у CityBank (Лондон) на ім'я Продавця безвідкличний підтверджений акредитив на сто відсотків (100%) від загальної суми Контракту. Акредитив дійсний протягом трьох (3) місяців.

4.2. Платіж за цим акредитивом у розмірі ста відсотків (100%) від загальної суми Кон-тракту здійснюється в анг-лійських фунтах проти пред' явлення наступних відвантажу-вальних документів:

4.2.1. Оригіналу коносамент та, виписаного на ім'я Покупця, із вказівкою кінцевого порту призначення Одеса (Україна).
4.2.2. Відвантажувальної специфікації.
4.2.3. Сертифікату якості.
4.2.4. Сертифікату походження товару.
4.2.5. Пакувального списку.
4.2.6. Страхового поліса.

5. Технічна документація

5.1. Протягом п'яти (5) днів з моменту поставки Продавець повинен надіслати на адресу Покупця два (2) комплекти технічних документів, перерахованих у Додатку 2.

5.2. Усі пояснення на кресленях повинні бути зроблені англійською мовою. Повинні бути також надані переклади українською мовою усіх пояснень на кресленнях, що входять у п.п.1, 2, 3 і 4 Додатку 2.

6 Гарантія якості Обладнання

6 1. Гарантійний строк складає дванадцять (12) місяців з моменту запуску Обладнання, що фіксується у відповідному Акті, підписаному уповноваженими представниками сторін, які укладають цей Контраст, але не більше вісімнадцяті (18) місяців з дати поставки Обладнання.

6.2. Якщо Обладнання вийде з ладу протягом гарантійного строку, Продавець повинен за власний рахунок і за вибором обоє сторін або усунути наявні дефекти, або замінити облад-нанія, яке вийшло з ладу, новим обладнанням відповідної якості, яке повинно бути без затримки доставлене У порт прзначення.

7. Пакування

7.1. Обладнання має бути поставлене у морській експортній упаковці, призначеній для транспортування обладнаній даного типу. Упаковка повинна також бути придат-ною для транзитних переве-зень і для зберігання Облад-нанія протягом розумного стрску.

7.2. Кожний контейнер за розмірами не повинен перевищувати наступні габарити: довжина — 2 500 мм, ширина -2 500 мм, висота — 2 500 мм.

7.3. Продавець несе відпові дальність перед Покупцем за будь-які пошкодження Об ладнання, що сталися через йо го неправильне пакування.

8. Маркування

8.1. Всі контейнери мар-куються з трьох (3) сторін. На кожному контейнері повинні бути нанесені незмивною фарбою наступні написи (ук раїнською і

English):

Contract No.
Seller: Continental Equipment Plc (Address)
Buyer: TST Systems Ltd. (Address)
Railway Station of Destination: Kyiv
Container No.:
*Gross weight:*____kg
*Net weight:*____kg
Case dimensions in cm (length x width x height)

8.2. If a case requires special handling it should bear additional marks: "Fragile", "Top" or "This side up", etc.

9. Shipping Instructions and Notifications

9.1. Within twenty-four (24) hours after shipment, the Seller is to inform the Buyer by fax regarding the date of shipment, the Bill of Lading number, number of containers, their weight, the vessel name.

10. Insurance

10.1. The Seller is to take care of and cover expenses for insurance of the Equipment under the Contract from the moment of its dispatch up to the moment of its arrival at the port of Odessa.

11. Sanctions

11.1. In the event of delay in delivery of the Equipment the Seller is to pay the Buyer a penalty at the rate of 1.0% of the total contract value for every week of delay. However, the total amount of penalty for delay in delivery is not to exceed 10% of the total contract value.

11.2. While calculating penalty for delay, the amount of days comprising over half of a calendar week is considered to be a full week.

12. Force Majeure

12.1. The Parties are released from their responsibility for partial or complete non-execution of their liabilities under the Contract should this non-execution be caused by the force majeure circumstances including, but not limited to: fire, flood, earthquake, and if these circumstances have had a direct damaging effect on the execution of the present Contract.

12.2. The Party which is unable to fulfil its obligations under this Contract is to inform the other Party within ten (10) days from the beginning of force majeure circumstances.

13. Arbitration

13.1. The Seller and the Buyer will take all possible measures to settle amicably any disputes or differences which may arise out of the present Contract or in connection with it.

13.2. If the Parties do not come to an agreement, all the disputes and differences are to be submitted for Arbitration in Stockholm, Sweden, in accordance

англійською мовами):

Контракт №
Продавець: Continental Equipment Plc (Адреса)
Покупець: TST Systems Ltd. (Адреса)
З/д станція призначення: Київ
Контейнер № :
*Вага брутто:*____кг
Вага нетто: ____кг
Розміри контейнера у см (довжина х ширина х висота)

8.2. Якщо контейнер потребує спеціального поводження, то на ньому повинно бути нанесене додаткове маркування: "Крихкий", "Вверх", або "Тут верх" тощо.

9. Інструкції і повідомлення про відвантаження

9.1. Протягом двадцяти чотирьох (24) годин після відвантаження обладнання Продавець повинен повідомити Покупця факсом про дату відвантаження, номер коносаменту, кількість контейнерів, їх вагу, назву судна.

10. Страхування

10.1 Продавець здійснює страхування Обладнання, що поставляється у відповідності до цього Контракту, і покриває усі пов'язані з цим витрати з моменту відвантаження Обладнання і до моменту прибуття його у порт Одеси.

11. Санкції

11.1 У випадку затримки поставки Обладнання Продавець повинен виплатити Покупцеві пеню у розмірі 1% від загальної суми Контракту за кожний тиждень затримки поставки. При цьому, загальна сума пені за затримку поставки Обладнання не повинна перевищувати 10% від загальної суми Контракту.

11.2. Під час розрахунку пені за затримку поставки Облад-нання кількість днів, що перевищує половину календарного тижня, вважається повним тижнем затримки.

12. Форс-мажор

12.1. Сторони звільняються від відповідальності за повне або часткове невиконання своїх обов'язків за цим Кон-тарктом, якщо таке невиконання було викликано форсмажорними обставинами, які включають, але не обмежу- ються такими, причинами, ЯК| пожежа, повінь, землетрус, її якщо дані обставини малий безпосередній вплив на можливість виконання цих зо-бов'язань.

12.2. Сторона, яка не може виконати своїх зобов'язань за даним Контрактом, повинна протягом десяти (10) днів після початку дії форс-мажорних обставин повідомити іншу сторо-ну про їх наявність.

13. Арбітраж

13.1. Покупець і Продавець вживають усі можливі заходи для врегулювання спорів розбіжностей, які можуть виникнути під час виконання цього Контракту або у зв'язку з його виконанням.

13.2. Якщо сторони не мо-жуть дійти згоди, усі спори і розбіжності передаються на розгляд до арбітражного

with the rules and regulations of the Chamber of Commerce in Stockholm and applying the substantive laws of Sweden.	суду у Стокгольмі (Швеція) згідно з правилами і положеннями Торгової Палати Стокгольму і із застосуванням відповідних законів Швеції.
14. Other Terms 14.1. The Seller upon written consent of the Buyer shall be permitted to substitute equipment of comparable quality and conforming to the technical requirements for any item of equipment that may not be available for one reason or another. 14.2. Any changes, amendments or supplements to the terms and conditions of this Contract shall be valid only if set forth in a written document duly signed by authorized representatives of both Parties to the present Contract. 14.3. After the Contract has been signed all the preliminary agreements, discussions and correspondence between the Parties concerning this Contract are to be considered null and void if conflicting with this Contract. 14.4. The Contract becomes effective and comes into full force from the date of signing.	*14. Інші умови* 14.1. За наявності письмової згоди Покупця Продавець може здійснити заміну тих чи інших частин Обладнання, яких з тієї чи іншої причини нема в наявності, на інше обладнання порівняної якості, яке задовольняє технічним вимогам. 14.2. Будь-які зміни, поправки і доповнення до умов цього Контракту вважаються дійсними тільки у тому випадку, якщо вони зроблені письмово і належним чином підписані уповноваженими представниками сторін. 14.3. Після підписання Контракту всі попередні угоди, домовленості та листування між сторонами, які уклали цей Контракт, стають недійсними, якщо вони суперечать положенням цього Контракту. 14.4. Контракт набуває чинності і вступає в силу з датийого підписання.
15. Legal Addresses of the Parties SELLER (ПРОДАВЕЦЬ): Continental Equipment Plc 9 North Road Brighton BN1 5JF England for and on behalf of the Seller (від імені та за дорученням Продавця) Alfred Rogers Chairman (Президент)	*15. Юридична адреса сторін* ПОКУПЕЦЬ (BUYER): TST Systems Ltd. P.O.Box 171 Kyiv 253100 Ukraine від імені та за дорученням Покупця (for and on behalf of the Buyer) Віктор Клименко Коммерційний директор (Commercial Director)

SELF-ASSESSMENT

1) What is the purpose of including legal language in a contract?
   a) To make the contract longer and more formal
   b) To make the contract legally binding and enforceable
   c) To make the contract more difficult to understand
2) When writing a contract, what should be included in the terms and conditions section?
   a) The names of the parties involved
   b) Payment terms
   c) The scope of work or services to be provided d) All of the above
3) Why is it important to use clear and concise language in a contract?
   a) To make the contract more formal
   b) To make the contract easier to read and understand
   c) To make the contract more legally binding
4) What is the purpose of having all parties sign and date a contract?
   a) To make the contract legally binding and enforceable
   b) To make the contract more formal
   c) To make the contract longer
5) When drafting a contract, what should you do if you are unsure about the legal language or requirements?

a) Include the legal language you think is appropriate
b) Consult with a lawyer or legal professional
c) Ignore the legal requirements and write the contract as you see fit

PRACTICAL PART

I.Preparation

Before reading study the following vocabulary:
Epoxy
durable
Reinforce
Limestone
Emmisions
Decomposing
Humidity
replacement
To reduce
Transparent

II.Reading Text

Innovative construction materials

Modern materials science has advanced noticeably in recent years. Today, there are truly revolutionary new building materials on the market. Innovative synthetic materials are being created — building materials that are lighter, stronger, and more environmentally friendly than traditional materials. These advances stimulate new architecture, totally different from what we are used to and more environmentally friendly.

Transparent Wood

The invention of the newest eco-friendly material — transparent wood — was announced back in 2016. However, it was only in 2020, that the scientist who invented a method to make wood transparent in collaboration with a team from the University of Maryland at College Park, stated that the tests were completed and that they had achieved a stable result. Transparent wood is at least 5 times stronger and lighter than glass, as well as being more thermally efficient. It is these characteristics that make it an interesting potential replacement for plastic or glass windows. Other advantages: the raw material is renewable and eco-friendly. The balsa tree grows quickly, with a tree growing to adulthood in just 5 years. Production costs are also much lower than in glass production, where there is a noticeable carbon footprint due to the high temperatures required and electricity used in the process.

Transparent wood is quite flexible, as it contains natural cellulose. In order to achieve transparency, balsa wood is soaked in a special solution and then epoxy resin is added to the structure. Transparent wood or wooden glass can be used instead of traditional glass units or other elements in building structures that have to be transparent, but also durable, eco-friendly, and energy-efficient.

Carbon Fibre

Carbon fibre is truly a material of the future – albeit one that has long been used in different sports! However, this innovative material has been more and more frequently used in construction, an industry that often demands a combination of strength and lightness. Carbon fiber is 75% lighter than iron and 30% lighter than aluminium. It is used to reinforce traditional building materials to improve their strength — bricks, reinforced concrete blocks, wooden structures — as well as to reduce the thickness of panels and, accordingly, lower their weight. Carbon fibre reinforcement for concrete also provides excellent thermal insulation. The only disadvantage that restricts its widespread application is the high cost of the material.

Self-healing concrete

The term "self-healing concrete" sounds more than a little fantastical. Back in 2015, inventor Henk Jonkers from Delft University of Technology showed an innovative method to repair cracks in concrete using bacteria. The principle of the technology is simple: capsules containing specific bacteria and nutrients for them were added to the concrete: the bacteria were activated as soon as water hit. Cracked concrete was rebuilt with moisture, filled with limestone produced by the bacteria.

In addition to this bio-technology, there is another alternative from Korean researchers in which capsules of a certain polymer are added to concrete. Under the influence of moisture and sunlight, it also begins to react, swelling and filling the crack.

Traditional concrete is a very reliable and well-established building material, but it loses its properties when cracked. Many materials science specialists around the world are working on giving the base material a modern upgrade.

Biochar

Biochar is a substance that resembles charcoal and is made from decomposing organic matter at high temperatures without oxygen. Manufacturers add soil additives to improve water absorption and capture humidity in biochar. Biochar is a good building material that reduces most greenhouse emissions from concrete and plastics. Converting the total organic wastes in landfills to biochar would reduce global methane emissions by 11%. Adding biochar to bricks reduces cement amounts used in concrete and overall carbon dioxide formed during concrete manufacture. Biochar is also used with plastics to make bricks and lessen the global quantities of plastic wastes.

From: https://www.autodesk.com/blogs/construction/innovative-construction-materials/

✍ **After-text exercises**

1.Do a comprehension quiz:

1. What is a key advantage of transparent wood?
   a) It is heavier than glass
   b) It is more thermally efficient than glass
   c) It cannot be used in construction

d) It is not eco-friendly

2. What is the primary material used to create transparent wood?
   a) Balsa wood
   b) Pine wood
   c) Oak wood
   d) Bamboo
3. Which material is *75% lighter than iron* and *30% lighter than aluminum*?
   a) Transparent wood
   b) Carbon fiber
   c) Self-healing concrete
   d) Epoxy resin
4. What industry has begun using carbon fiber to reinforce building materials?
   a) Automotive industry
   b) Aerospace industry
   c) Construction industry
   d) Textile industry
5. What is the main disadvantage of using carbon fiber in construction?
   a) It is too light
   b) It is too expensive
   c) It is difficult to work with
   d) It is not eco-friendly
6. What type of bacteria is used in the self-healing concrete method?
   a) Bacteria that produce limestone
   b) Bacteria that grow on wood
   c) Bacteria that dissolve cracks
   d) Bacteria that produce carbon fiber
7. What happens when moisture interacts with the self-healing concrete's bacterial capsules?
   a) The concrete hardens
   b) The concrete cracks more
   c) The bacteria are activated and rebuild the concrete
   d) The concrete turns into transparent wood
8. How long does it take for a balsa tree to grow to adulthood?
   a) 1 year
   b) 3 years
   c) 5 years
   d) 10 years
9. What is the production cost of transparent wood compared to traditional glass?
   a) Higher than glass
   b) About the same as glass
   c) Lower than glass
   d) No difference
10. What is one application of transparent wood in construction?
    a) As a replacement for steel beams
    b) For glass windows and building elements

c) For flooring material
d) As a material for the roof structure

2. Answer the questions:

1) What are the main benefits of transparent wood compared to traditional glass?
2) How does carbon fiber improve the strength and lightness of building materials?
3) Explain how self-healing concrete works to repair cracks in structures.
4) What are some of the disadvantages of using carbon fiber in construction?
5) Why is transparent wood considered an eco-friendly material?
6) **How does self-healing concrete contribute to the sustainability of construction projects?**

3. True/false:

1) Transparent wood is more thermally efficient and lighter than glass.
2) Carbon fiber is heavier than aluminum and is not used in construction.
3) Self-healing concrete is capable of repairing cracks using bacteria that produce limestone.
4) Balsa wood is used to create transparent wood because it grows slowly, making it eco-friendly.
5) The production of transparent wood has a higher carbon footprint than the production of glass.
6) The main disadvantage of carbon fiber is its low thermal insulation properties.
7) Self-healing concrete is made by adding special bacteria to the concrete that are activated by moisture.

4. Fill in the blanks with the correct terms from the text:

Word bank: Transparent wood, Carbon fiber, Self-healing concrete, Balsa wood, Thermal insulation, Environmental impact.

1. The invention of _____ was announced in 2016, and it is being considered as a potential replacement for traditional glass in building structures due to its strength and energy efficiency.
2. _____ is a material that is 75% lighter than iron and 30% lighter than aluminum, and it is often used in construction to reinforce materials like concrete and wood.
3. _____ is a bio-technology that involves adding bacteria to concrete, allowing it to repair itself by filling cracks with limestone when moisture is present.
4. _____ is used in the creation of transparent wood because it grows quickly and provides an eco-friendly material that can be used in construction.
5. One of the key advantages of _____ is that it provides excellent _____, making it ideal for use in construction projects that require energy-efficient materials.

6. The _____ of building materials is an important consideration, as the manufacturing processes of some materials, like glass, can produce significant pollution.

5. Match the words with their definitions:

Column A	Column B
1. Transparent wood	a) A material 75% lighter than iron, used for reinforcing building materials.
2. Carbon fiber	b) A bio-technology that allows concrete to repair itself by filling cracks with limestone.
3. Self-healing concrete	c) A renewable, eco-friendly material made from balsa wood that can be used as a glass alternative.
4. Balsa wood	d) A material that provides energy efficiency and is considered an alternative to glass in buildings.
5. Thermal insulation	e) The impact of the manufacturing and use of building materials on the environment.
6. Environmental impact	f) A lightweight and fast-growing wood used in making transparent wood.

6. Role play. The Engineer and Architect are discussing the potential use of innovative materials for a new eco-friendly building project. The Engineer introduces new materials to the Architect, and they discuss their potential benefits and challenges.

Engineer:
Hi, I've been reading about some fascinating new materials that could be perfect for our upcoming project. Have you heard of **graphene**? It's a material made from……. It's……..—100 times stronger than steel!

Architect:
I've heard of graphene, but I didn't know it could be used in construction. How does it compare to other materials, like steel or concrete?

Engineer:
It's much…….. It could be used in structural elements, reducing the amount of heavy material we need, which would save space and reduce transportation costs. It's also a good conductor of heat, so it can be used for…….

Architect:
That sounds promising, especially for the structural components. What about insulation? I'm interested in sustainable insulation materials for the building.

Engineer:
You might be interested in **aerogel**. It's known as "……" because it's so …….. It has excellent……. and could help reduce energy consumption in the building. It's a bit more expensive than traditional materials, but the energy savings could offset the initial cost.

Architect:
I like the sound of that! Aerogel could be great for the exterior walls. What other eco-friendly materials are you thinking of?
Engineer:
I also came across **hempcrete**. It's a……. It's……. It's also carbon-negative, meaning it absorbs more CO2 than is released during its production.
Architect:
I love the idea of hempcrete! It's sustainable, and using more plant-based materials could give the building a unique, natural feel. But I'm curious—how does it compare to traditional concrete in terms of durability?
Engineer:
Hempcrete is not as strong as traditional concrete, so it's typically used for…….. However, it's an excellent insulator and can help with humidity control. For structural elements, we could combine it with other materials like carbon fiber for reinforcement.
Architect:
Great! It sounds like we have a few exciting options to consider for this project. Let's set up a meeting with the team to discuss these materials in more detail.

7. **Writing.** This template provides a structured approach to drafting a supply contract for innovative construction materials. You can adjust the terms based on your specific material, needs, and legal requirements.

Section	Details
1. Material Specifications	**Material Name**: [Material Name] **Type of Material**: [Type, e.g., Graphene, Hempcrete, Transparent Wood] **Quality Standards**: [ISO Certifications, Environmental Impact, etc.] **Quantity**: [Insert Quantity] **Delivery Date**: [Insert Date(s)] **Price**: [Price per unit] **Material Description**: [Brief description of material's key properties, benefits, and uses]
2. Price and Payment Terms	**Price per Unit**: [Insert price per unit] **Total Cost**: [Insert total price] **Payment Schedule**: - Deposit of [Deposit Amount] upon signing - Remaining balance of [Balance Amount] upon delivery **Payment Method**: [Bank Transfer, Credit Card, etc.]
3. Delivery and Acceptance	**Delivery Location**: [Insert Address] **Delivery Date(s)**: [Insert Date(s)] **Packaging**: Material to be appropriately packaged to prevent

	damage. **Inspection**: Buyer to inspect within [X] days of delivery. Any issues should be reported within this period.
4. Warranty and Liability	**Warranty Period**: [Warranty Period, e.g., 12 months] **Warranty Terms**: Replacement or repair of defective materials at no cost within the warranty period. **Liability**: Supplier not liable for indirect, incidental, or consequential damages.
5. Confidentiality	Both Parties agree to keep all proprietary and confidential information exchanged under this Contract confidential for [X] years after termination.
6. Termination	This Contract may be terminated under the following conditions: - **Mutual Agreement**: Written consent by both Parties. - **Breach of Contract**: Failure to perform obligations, with [X] days to remedy the breach. - **Force Majeure**: Unforeseen circumstances beyond control (e.g., natural disasters).
7. Dispute Resolution	Disputes to be resolved by negotiation, or if unresolved, through [Arbitration/Mediation] under the laws of [Jurisdiction/State/Country].
8. Miscellaneous	**Governing Law**: [Jurisdiction] **Force Majeure**: No liability for failure to perform due to uncontrollable events. **Entire Agreement**: This is the entire agreement, with amendments requiring written consent from both Parties.
9. Signature	**Supplier:** Signature: _____ Name: [Insert Name] Title: [Insert Title] Date: _____ **Buyer:** Signature: _____ Name: [Insert Name] Title: [Insert Title] Date: _____ **Witness (Optional):** Signature: _____ Name: [Insert Name] Date: _____

CHAPTER 4. INNOVATIVE CONSTRUCTION TECHNOLOGIES

UNIT 11. 3-D PRINTING
THEORETICAL PART

 ***Read and check your understanding.***

CONFERENCE VOCABULARY

Conferences play a crucial role in facilitating knowledge exchange, collaboration, and innovation across various disciplines and industries. Whether academic, professional, or trade-focused, conferences offer valuable opportunities for learning, networking, and professional development, contributing to individual growth and collective advancement within the global community.

Benefits of Conferences:

Knowledge Exchange: Conferences provide opportunities to learn about the latest research, trends, and best practices within a particular field.

Networking: Attendees can connect with peers, experts, and potential collaborators, expanding their professional network and fostering partnerships.

Professional Development: Conferences offer workshops, seminars, and skill-building sessions to enhance participants' knowledge and expertise.

Visibility and Recognition: Presenting research or speaking at conferences can increase visibility and recognition within one's field of expertise.

Inspiration and Motivation: Engaging with like-minded individuals, hearing success stories, and learning about groundbreaking innovations can inspire and motivate attendees in their respective endeavors.

Conference Vocabulary:

Early Bird Registration: A discounted registration fee offered to attendees who register for the conference before a specified early bird deadline.

Late Registration: Registration for the conference after the early bird deadline, often subject to higher fees.

Registration Fee: The cost associated with attending the conference, covering access to sessions, materials, meals, and other conference amenities.

Student Rate: A reduced registration fee offered to students attending the conference, typically requiring proof of current enrollment.

Presenter: An individual who delivers a presentation, speech, or paper at the conference, sharing research findings, insights, or expertise on a specific topic.

Proceedings: A compilation of papers, abstracts, or presentations delivered at the conference, often published in print or digital format for distribution to attendees.

Poster Presentation: An alternative to oral presentations, where presenters display research findings or project summaries on posters for viewing and discussion by conference attendees.

Session Chair: An individual responsible for moderating a session, introducing speakers, managing time, and facilitating audience participation.

Conference App: A mobile application designed to provide attendees with access to conference schedules, session details, networking opportunities, and interactive features.

Awards Ceremony: A formal event held during the conference to recognize outstanding contributions, achievements, or research excellence in specific areas related to the conference theme.

Vendor Booth: A designated space within the exhibition hall where vendors, sponsors, or exhibitors showcase products, services, or solutions relevant to conference attendees.

Ballot: A voting form or paper used to cast votes or make selections, typically used in elections, awards, or decision-making processes during the conference.

Agenda: A detailed schedule or outline of sessions, presentations, activities, and events planned for the conference, including timings, topics, speakers, and locations.

Keynote Speaker: A distinguished speaker who delivers a keynote address at the opening or closing of a conference, setting the tone and providing insights on the main theme.

Panel Discussion: A session where a group of experts or panelists discuss a specific topic, often moderated by a facilitator.

Workshop: An interactive session where attendees engage in hands-on activities, discussions, or exercises to learn practical skills or explore specific topics in depth.

Breakout Session: Concurrent sessions held simultaneously during the conference, offering attendees the opportunity to choose from a variety of topics based on their interests.

Networking Event: A designated time or session for attendees to connect with each other, share ideas, and build professional relationships.

Delegate: An individual attending the conference, often representing an organization or institution.

Plenary Session: A session attended by all conference participants, typically featuring keynote speakers, presentations, or discussions on overarching themes or topics.

Abstract: A concise summary of a presentation, paper, or research topic submitted for consideration to be included in the conference program.

Facilitator: A person responsible for guiding discussions, managing sessions, and ensuring smooth communication and interaction among participants.

Feedback Form: A questionnaire or survey provided to attendees to gather feedback and evaluations on the conference content, organization, and overall experience.

Live Polling: An interactive tool used during sessions to engage attendees by allowing them to respond to polls or surveys in real-time using mobile devices or audience response systems.

Closing Remarks: Concluding statements delivered by conference organizers or hosts, summarizing key takeaways, expressing gratitude to participants, and providing information on future events or initiatives.

Here are some phrases commonly used in conferences:

Opening Remarks:

"I'm delighted to see such a diverse and engaged audience here today."
"Thank you all for joining us. Let's get started with our first session."

Introduction of Speakers:

"Our first speaker is [Name], who will be sharing insights on [Topic]."
"Next, we have [Name], an expert in [Field], who will be discussing..."
"Please join me in welcoming [Name] to the stage."

Transitioning Between Sessions:

"Now that we've heard from [Speaker Name], let's move on to our next topic."
"Before we proceed, does anyone have any questions for our current speaker?"
"Our next session will focus on [Topic], led by [Speaker Name]."

Encouraging Audience Participation:

"We value your input and encourage you to share your thoughts and questions."
"Don't hesitate to raise your hand if you have any comments or insights to contribute."
"Let's make this session interactive. I invite you all to join the discussion."

Moderating Discussions:

"Thank you for those insightful questions. Let's address them one by one."
"I'd like to hear from some of our quieter attendees. What are your thoughts on this topic?"
"Let's keep the conversation focused and respectful as we explore different perspectives."

Closing Remarks:

"As we wrap up [Conference Name], I want to express my gratitude to our speakers, sponsors, and attendees."
"I hope you found today's discussions valuable and inspiring. Safe travels, and see you next time."
"Thank you all for your participation. Let's continue the conversation online and stay connected.

SELF-ASSESSMENT

1. What is the primary purpose of an academic conference?
   a) Networking with industry professionals
   b) Showcasing innovative products
   c) Sharing research findings and scholarly work
   d) Organizing entertainment events
2. What type of session at a conference involves a group of experts discussing diverse perspectives on a specific topic?
   a) Keynote speech

b) Workshop
c) Panel discussion
d) Poster presentation

3. Which of the following is a common feature of trade shows or expos within a conference?
a) Hands-on activities
b) Research presentations
c) Showcasing products and innovations
d) Interactive debates

4. What is the purpose of a networking event at a conference?
a) Showcasing keynote speakers
b) Demonstrating new technologies
c) Connecting attendees and building professional relationships
d) Presenting awards and recognitions

5. What are some benefits of attending conferences?
a) Decreased visibility and recognition
b) Limited opportunities for networking
c) Enhanced learning and professional development
d) Decreased motivation and inspiration

PRACTICAL PART

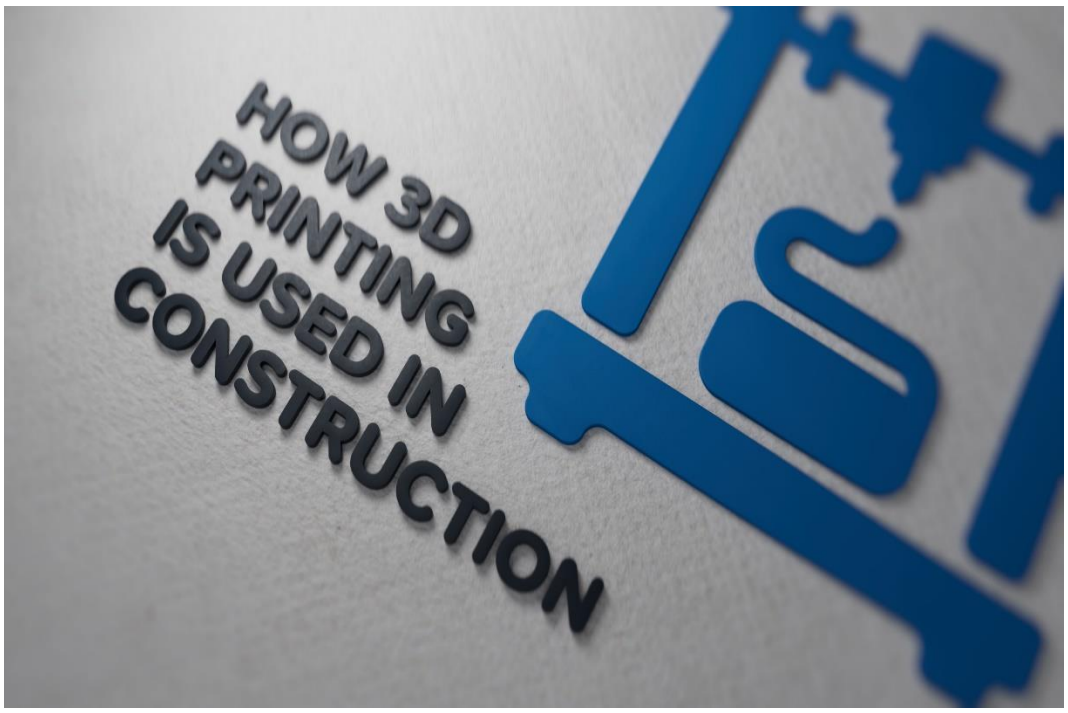
I.Preparation

Before reading study the following vocabulary:

Gantry
Extruding
Prototyping
Modeling
Layering
Powder Binding
Additive Welding
Computer-Aided Design (CAD)
Building Information Modeling (BIM)
Prefabricate
Cost Estimation
Construction Takeoff

II.Reading a text

How 3D Printing Is Used in Construction



Three-dimensional printing (3D printing) converts digital plans into physical structures. 3D printers create thin layers using plastic, resins, or metal. They continuously add layers on top of one another to build a complete structure.

3D printers usually get the data to guide their printing process from a computer-aided design (CAD) program. 3D printers can create products. They can also print parts or components for larger structures. For instance, a 3D printer can create specific components for construction projects.

The use of 3D printing in construction is set to explode. Projections by Precedence Research predict that the 3D printing construction market will grow to $519.49 billion by 2032. In 2022, the market was only worth $3.42 billion.

Due to this growth, construction companies need to understand the processes and applications of 3D printing. Here's a closer look at this relatively new, but rapidly growing, specialty.

Prototyping

Prototyping can be an essential part of pre-construction planning. 3D printing as part of building design and construction can streamline the prototyping process, and make it possible to construct multiple prototypes in a short period.

These prototypes can be useful for several reasons.

A scale prototype of an entire building helps assess its feasibility and structural integrity. Engineers can test or observe the model to check for potential problem areas.

A prototype can also help ensure accurate measurements for cost and time estimates for the project. A 3D model can help improve the accuracy of cost estimation.

Designers and engineers can make prototypes of specific components for testing. They can use it to solve any problems and perfect the design before producing multiple components for use in their building.

In some cases, construction managers can use software to read the CAD drawings for the 3D printed prototype. They can input this data into construction planning software to help create more accurate estimates and assist with project planning.

Modeling

Modeling is similar to prototyping, except for a few key differences. Architectural modeling during the design stage focuses on the creative and visual aspects of building plans. For instance, it may highlight the most attractive elements of the structure.

Modeling can be important for getting investors for a project or showing current stakeholders what the building will look like after completion.

Like prototyping, modeling allows architects to perfect the visual elements of the design before they start building. A 3D printer can help make a more accurate representation of the model based on architectural plans. It can also speed up the modeling process and allow architects to make multiple models quickly to assess different design ideas.

Robotic Arm Extruding

3D printers rely on a gantry (a large frame) for mounting. The printer can move up and down on this structure. In this setup, the printer essentially adds many 2D layers, from the ground up, to create a 3D object.

Robotic arm extruding is a more flexible printing setup. It uses a mechanical arm with the printer nozzle mounted on a rotating head. This setup offers more flexibility, which is necessary for some construction projects. For instance, a printer mounted on a robotic arm can add elements to walls.

Robotic arm extrusions can also be useful for large components that won't fit on a gantry. These tools are commonly used in cement.

Layering

With lower labor costs and more precise construction based on digital designs, these projects offer benefits versus traditional construction. These projects are often much faster, with some houses taking 24 hours to build (though extra time is necessary for additional components, fixtures, and finishing).

In many cases, construction companies use layering to print components of a building. They then take these elements to the construction site and install them alongside components made by traditional methods.

3D Concrete Printing

3D printers build objects and architectural features layer by layer. In some instances, a printer can create an entire house from the ground up using this technique. These constructions typically use 3D printers to lay a foundation and layer concrete for the walls before adding roofing. Recently, a company in Texas built a small home using concrete printing.

Powder Binding

Powder binding involves adding thin layers of powder to a surface and then spraying a binding substance that creates a solid. Binding materials can be metal, ceramic, sand, polymers, or mineral composites.

Thin jets of binding liquid can create solids in specific places, allowing the designer to create detailed shapes. The binding process gets repeated for each subsequent layer, allowing the construction of complete 3D structures.

Powder and binding agents are often cheaper than other 3D printing materials. Also, very fine jets can spray liquid and create detailed patterns. This printing method works with a wide range of materials.

Powder binding is useful for ceramic components or metal hardware. However, the composition of 3D powder binding products is more porous than other types of printing, making the products inappropriate for structural or weatherproofing applications.

Additive Welding

Welding additive 3D printing is a method for creating metal components for construction. Technically, this process is known as wire arc additive manufacturing (WAAM). The 3D printer continuously welds layers of metal to create a 3D structure.

This approach is especially useful for complex or very detailed welding jobs or metal components in a construction project. Because this process results in strong structural components, it is well-suited for construction.

Creating Individual Parts

While cement-based 3D printing can create an entire house or prefabricate components that construction contractors can then assemble onsite, 3D printers can also create smaller components.

The advantage of 3D parts printing is that it can create customized elements that fit the exact needs of a specific project instead of relying on pre-fabricated hardware. Producing these parts on or near the construction site can reduce transport costs and eliminate delays caused by shipping additional components.

Also, the construction teams can produce parts as needed, avoiding waste problems from ordering too many unused pieces during construction.

Combining With Other Technologies

Architects, engineers, and designers can combine 3D printing with other technologies. For instance, the same CAD designs and data used for 3D printing can help construction takeoff software make accurate measurements and estimates. Cost estimators can automate their processes using automated measurements from CAD models. And, contractors can use 3D printed models to assess the project based on expected materials and labor time.

Building information modeling (BIM) provides design and engineering information for the project. This software can provide guidelines for the exact materials and shape of 3D printed components within the overall building.

The use of 3D printing in construction is on the rise and will continue to increase exponentially in the coming years. Your company needs to understand how to use these tools effectively to increase efficiency and productivity without compromising quality.

From: https://www.kreo.net/news-2d-takeoff/how-3d-printing-is-used-in-construction

✍ After-text exercises

1. Do a comprehension quiz:

1. What is 3D printing primarily used for in construction?
   A) Painting structures
   B) Adding extra decorative details
   C) Converting digital plans into physical structures
   D) Electrical wiring
2. Which software is commonly used to create data for 3D printing?
   A) CAD (Computer-Aided Design)
   B) Word Processor
   C) Spreadsheet software
   D) Animation software
3. Which material is *not* typically used in 3D printing for construction?
   A) Plastic
   B) Resins
   C) Wood
   D) Metal
4. What is a major benefit of prototyping with 3D printing in construction?
   A) Reduces the overall size of the project
   B) Provides visual effects for advertising
   C) Assists in cost and time estimation
   D) Replaces the need for engineering reviews
5. What is the main difference between prototyping and modeling in construction?
   A) Prototyping focuses on creative aspects, while modeling is for functional parts
   B) Prototyping is functional, while modeling focuses on the visual design
   C) Modeling is more durable than prototyping
   D) Modeling is less expensive than prototyping
6. Which of the following describes Robotic Arm Extruding?
   A) Adding multiple small arms to the printer
   B) Using a flexible, rotating arm to add layers
   C) Building only small components of structures
   D) Printing components using powdered metals
7. Which 3D printing technique is often used for creating ceramic components?
   A) Layering
   B) Powder binding
   C) Robotic arm extruding
   D) Additive welding
8. What is the primary benefit of Additive Welding in construction?
   A) Creating lightweight decorative parts
   B) Quickly producing large, flat panels
   C) Building strong, structural metal components
   D) Reducing costs by using powdered metal

9. What is one reason for combining 3D printing with Building Information Modeling (BIM)?
   A) To improve the speed of printing
   B) To gather data for choosing materials and estimating costs
   C) To replace CAD design
   D) To avoid using digital models
10. What is an advantage of printing individual parts onsite?
   A) Parts are lighter in weight
   B) Reduces transportation costs and avoids waste
   C) Adds flexibility in design changes during construction
   D) Minimizes the need for traditional tools

2. **Answer the questions**:

1) Explain how 3D printing can reduce costs and time in construction projects.
2) What is the role of CAD programs in 3D printing, and why are they essential for construction applications?
3) How does prototyping with 3D printing assist engineers in assessing the feasibility and integrity of a building's design?
4) Describe the advantages of using a robotic arm extruding technique over traditional gantry-mounted 3D printing in construction.
5) What are some specific applications of powder binding in construction, and why is it not suitable for all construction purposes?
6) Discuss the impact of using additive welding in 3D printing for creating metal components. What makes this technique beneficial for construction?
7) In what ways can integrating 3D printing with other construction technologies, like BIM or construction takeoff software, improve project outcomes?

3. True/false:

1) 3D printing in construction can only be used to create complete buildings, not individual parts.
2) Robotic arm extruding provides more flexibility than traditional gantry-mounted 3D printers.
3) Powder binding is commonly used for creating structural and weatherproof components in construction.
4) Building Information Modeling (BIM) can be used alongside 3D printing to improve accuracy in project planning and material estimation.
5) Using 3D printing for prototyping can help engineers identify potential problem areas before full-scale construction.

4. **Fill in the blanks with the correct terms from the text:**

Word bank: 3D printing, Modeling, Robotic arm extruding Additive welding, Powder binding, CAD, 3D parts printing

1) _____ is a 3D printing technique that involves layering powdered material and applying a binding agent to form solid shapes.
2) In construction, 3D printing can use _____ software to create digital plans, which are then converted into physical structures by adding material layer by layer.
3) _____ in construction often combines with other technologies, like Building Information Modeling (BIM), to improve planning and accuracy in materials estimation.
4) _____ enables designers to create multiple visual models to explore different design ideas and engage potential investors.
5) The _____ technique in 3D printing allows construction companies to produce strong metal components through a continuous welding process.
6) With _____, construction teams can create customized parts on-site, which reduces shipping costs and minimizes delays.
7) _____ provides more flexibility for 3D printing in construction, especially when printing components that do not fit traditional gantry structures.

5. **Match the words with their definitions**:

Word	Definition
Robotic Arm Extruding	a) A method involving thin layers of powder and a binding agent to form solid structures.
Building Information Modeling (BIM)	b) The process of building a structure by adding thin layers of material one on top of another.
Additive Welding	c) A technique in 3D printing that uses concrete to create walls and foundations layer by layer.
Modeling	d) The use of 3D printing to create a small-scale model to assess structural integrity and design feasibility.
Prototyping	e) The creation of visual representations or designs for architectural or construction planning purposes.
Layering	f) Software that provides detailed design and engineering information to guide construction projects and 3D printing processes.
Powder Binding	g) A 3D printing technique where a flexible arm with a rotating nozzle applies layers to build complex shapes.
3D Concrete Printing	h) A method of 3D printing for metal parts, where layers of metal are continuously welded to form a solid structure.

6.Speaking. Prepare a brief presentation or discussion on the general information about role of a 3-D printer in construction: the advantages and limitations of using 3D printing in construction; how specific 3D printing methods (e.g., layering vs. additive welding) suit different parts of construction projects.

7.Watch the video
https://www.youtube.com/watch?v=vL2KoMNzGTo&ab_channel=InsiderArt

Write down main steps of building a concrete home with a 3-D printer.

8. **Role play.** The team is tasked with building a new, eco-friendly community center. Due to budget constraints, they need to decide which parts of the building to construct using 3D printing to save costs and time without compromising quality.

1. Each team member presents their perspective, emphasizing how 3D printing can support their role's objectives.
2. As a team, they must decide: Which parts of the building to construct using 3D printing (e.g., walls, columns, decorative elements).Which specific 3D printing techniques to use for each part.How to address any concerns about durability, cost, or design flexibility.
3. The team presents their final plan to the class, explaining their choices and addressing potential challenges and benefits of using 3D printing in the project.

UNIT 12. CONSTRUCTION TECHNOLOGY TRENDS

THEORETICAL PART
WRITING TECHNOCAL REPORT ON INSPECTION OF BUILDINGS

A technical inspection report for reconstruction or repair is a document that contains the results of a technical analysis of the condition of a building or its individual elements, which is carried out before starting repair or reconstruction work. The purpose of such a report is to identify possible defects, damages or problems that may affect the safety and success of the work.

The main objectives of a technical inspection:

Building condition assessment – determining the level of structural deterioration and identifying defects that may prevent reconstruction or repair.

Verification of compliance with regulations – verification of the extent to which the building or its individual elements comply with applicable building codes and standards.

Preparation for repair – providing technical recommendations on the necessary work and possible measures to eliminate the identified problems.

Confirmation of safety – ensuring the safety of further operation of the building after repair or reconstruction.

What the technical inspection report includes:

Description of the object: general information about the building, its location, year of construction, area, number of storeys, construction materials.

Analysis of the condition of structures: inspection of the foundation, walls, ceilings, roof, utilities (water supply, electrical wiring, sewage).

Detection of defects: fixing cracks, foundation settlements, corrosion of metal elements, deformations, etc.

Conclusions on the suitability for reconstruction: assessment of the possibility of safe reconstruction or repair of the facility.

Recommendations for the execution of work: specific proposals for the necessary measures to eliminate defects and ensure safe reconstruction (for example, replacement of damaged structures, strengthening of the foundation, repair of utilities).

Forecasts for further operation: an estimate of the service life of structures after the work is completed.

Types of technical inspection:

Initial inspection – is carried out to assess the general condition of the building before repair or reconstruction.

Detailed inspection – requires special studies, in particular laboratory tests of materials or detailed analysis of the condition of structures (for example, using non-invasive methods).

Re-inspection – carried out after certain stages of repair or reconstruction are completed to check the quality of the work performed and their compliance with the design decisions.

When it is necessary to conduct a technical inspection:

Before a large-scale reconstruction or redevelopment.
Before major repairs of old buildings.
After detecting serious defects or damage to structures.
After natural disasters or accidents that could affect the condition of the building.

BUILDING INSPECTION REPORT FORM

Inspector name/signature: ..... **Developer:** .....

Date/ time of inspection: ..... **Site location:** .....

Construction start date: ..... **Name of Contractor:** .....

Projected completion date: ..... **Address:** .....

The purpose of this checklist is to assess the compliance of construction fieldwork in relation to the approved construction drawings.

INFORMATION ON REINFORCED CONCRETE SITE PRACTICE

a. Conc. design mix: ..... b. *Method of*: conc. mixing: ..... ; concrete vibrating: .....

Source of: c. HCB: ..... d. Steel rebar: ..... e. Struct. timber:.....

#	Element Inspected	Compliant	Non-compliant	Comments *(add further comments on sheet and attach)*	GBG Ref.
	GENERAL SETBACKS				
1	Setbacks from boundaries				
2	Setbacks from roads				
3	Setbacks- special features				
	FOUNDATIONS				
4	Foundation preparation				
5	Foundation depths				
6	Foundation dimensions				
7	Reinforcement type/sizes				
8	Reinforcement arrangement				
9	Cover to reinforcement				
10	Reinforcement laps/continuity				
	COLUMNS				
11	Column size				
12	Column spacing				
13	Column bracing *(not greater than 10ft.)*				
14	Reinforcement type/sizes				
15	Reinforcement arrangement				
16	Cover to reinforcement				
17	Reinforcement laps/continuity				
18	Formwork				

Follow-up/Comments

Page 1 of 3

From: https://www.gbu.kyiv.ua/en/zvit-pro-tehnichne-obstezhennya-pry-rekonstrukcziyi-chy-remonti/

SELF-ASSESSMENT

1. What is the main purpose of a technical inspection report?
   A. To determine the architectural style of the building
   B. To identify potential defects and ensure safe reconstruction or repair
   C. To design a new building from scratch
   D. To calculate the cost of construction materials
2. What information is typically included in the "Description of the Object" section of a technical inspection report?
   A. History of the building's ownership
   B. General information such as location, year of construction, and materials used
   C. Local weather conditions
   D. Architectural design blueprints
3. Which of the following is an example of a defect that might be detected during a technical inspection?
   A. Modern architectural elements
   B. Properly installed utility systems
   C. Cracks in walls or foundation settlement
   D. Newly painted surfaces
4. What type of inspection involves laboratory tests and detailed analysis of structures?
   A. Initial inspection
   B. Re-inspection
   C. Detailed inspection
   D. Visual inspection
5. When is it necessary to conduct a technical inspection?
   A. After new furniture is installed in the building
   B. Before repainting the building's exterior
   C. After natural disasters or when serious defects are detected
   D. During routine maintenance work

PRACTICAL PART

I.Preparation

Before reading study the following vocabulary:

Augmented Reality (AR)
Interoperability
Blockchain
Digital Twin
Laser Scanner
4D Simulation
Procurement
ISO19650
Renovation
Fabricate

Scheduling
Intellectsoft

II.Reading Text

New construction technologies

The implementation of construction software and innovative construction technologies covers all construction stages, from project initiation to the on-site activities and the complementation stage.

Construction software is mostly used by AEC (architecture, engineering, and construction) personnel for project management activities such as scheduling, planning, estimating, design, facility management and more.

Virtual and Augmented Reality

Among the new construction technologies, virtual and augmented reality have been a great innovation, providing visualizations. With the $8 trillion forecast in the industry's global growth by 2030, the use of VR and AR would surely be significant. Having mentioned the possibility of a 90 percent reduction in building costs when implemented in 2022, AR/VR technology has been seen in various remote site inspections. It also enables safety, collaboration and communication among AEC personnel.

Drones

Drones have been used in construction for over a decade. In 2023 and beyond, expect more sophisticated and AI-oriented drones. With real-time aerial imagery and 3D lidar scans, drones are revolutionizing construction procedures.

Expect more interoperability with Scan to BIM mode on drones, taking microseconds to share construction data with other BIM-based platforms.

Blockchain Technology

In 2023 and beyond, the entire AEC industry will have better cost management and efficient procurement strategies via blockchain. It was no more than a decade ago when this technology was introduced to the construction industry, serving as linked collections of data "blocks" that make up a digital ledger, with the records of all transactions and completed milestones. It can be compared to a literal chain, with each link representing a distinct transaction in a project, and it automatically balances itself. Unlike others, it is safe, decentralized and adaptable to projects of any size**.**

Digital Twin

Solving operation management issues, the digital twin is the newest technology in the AEC industry. It involves the use of simulation in creating a building prototype. Digital twin trends and functionality cover the use of intelligent multidimensional digital models. In 2023 and beyond, there will be fewer buildings with operational issues, all due to the ability of digital twins to simulate, predict and inform decisions based on real-world conditions. Digital twins carry out performance analysis considering occupants' behaviours with the use of patterns and space.

3D Laser Scanner

Among the newest construction technology in the AEC industry is the 3D laser scanner. Its interoperability and modifications each year make it a consistently fresh innovation. It's known for its ability to scan and analyse real-world objects. It has been deployed for on-site surveying, mapping, project inspection, safety and many other tasks in construction. Its accuracy makes construction planning easy with significant cost savings.

Use Case

A practical application of this technology was Aiguilles-Queyras Hospital Center, a hospital located in the French Alps, in France. FARO, a brand of 3D laser scanner, was used along with Scan-BIM by ATFF to capture every feature of the existing hospital and a new model was generated for renovation.

4D Simulation

With the constant search for optimization in the construction industry, 4D simulations are one of the newest technical solutions to save time and cost for onsite and offsite projects.

Use Case

The Mott MacDonald company applied 4D simulation to its Haweswater Aqueduct's Bentley pipeline project, saving the company 20 days.

Put On Your Hard Hat - Construction Software Innovation Starts Here!

Building Information Modelling

BIM is another fast-rising innovative technology in construction across the globe. It is a crucial tool for modern architectural, engineering and building processes. With good interoperability, this technology allows for the creation of one or more precise digital models of buildings.

With its applications to projects in levels and dimensions, it's a new technology backed by the governmentally approved ISO19650 standard. BIM software enabling interoperability in 2022 includes Revit, Navisworks, Tekla, BIM Collab, Plannerly and Autodesk BIM 360.

Use cases

BIM covers a wide range of dimensions and levels. It has been used on several projects.

John Sisk & Son applied BIM in the Quintain Wembley project in London through its Digital Project Delivery (DPD) approach. It was also applied with Revit to model the NHS Nightingale Hospital, East London

3D Printing

3D printing, although not as widespread as BIM, is one of the newest technologies in the construction industry. Its mechanism, which involves making three-dimensional buildings from digital models, was first used in 1995. In 2023, the current trend includes creating 3D models via 3D software programs.

Use cases

Engineers at Arup used 3D printing to fabricate the steel nodes for a lightweight structure. In addition, Shanghai firm Win Sun Decoration Design Engineering applied 3D printing to spray a mixture of quick-drying cement and recycled raw materials.

Average Costs for Construction Software Development

As an individual or company who desires to own construction software, the first ideal question is, at what cost? As technical as this question might be, experts in engineering software still believe it might not be the first question.

Therefore, the first step is defining the design. Determine a brief idea of the necessary functionality, then the cost.

Richard Schmidt states, “Know what you are building before you begin to improve cost and scheduling accuracy.”

Generally, the average cost to develop construction software is sometimes less direct than others since this is highly customized software. Amidst other factors, the cost of developing construction software in 2023 is still based on core factors such as the scope, time and budget.

Regardless, there are statistics that show what should be expected in building such a system.

In terms of construction management software, the costs are based mostly on plans, such as basic, premium and advanced, and monthly costs.

These costs can be as low as $44 and can be as high as $9,900 per contractor per month. In general and on average, the statistics online show software development can cost between $50,000 to $250,000.

How to Invest in Construction Software Development Wisely

The rise of new technologies in the construction industry results from technological evolution. Despite these evolutions, there are still challenges in fully implementing digital norms in construction.

Explore Our Industry-Specific Case Studies

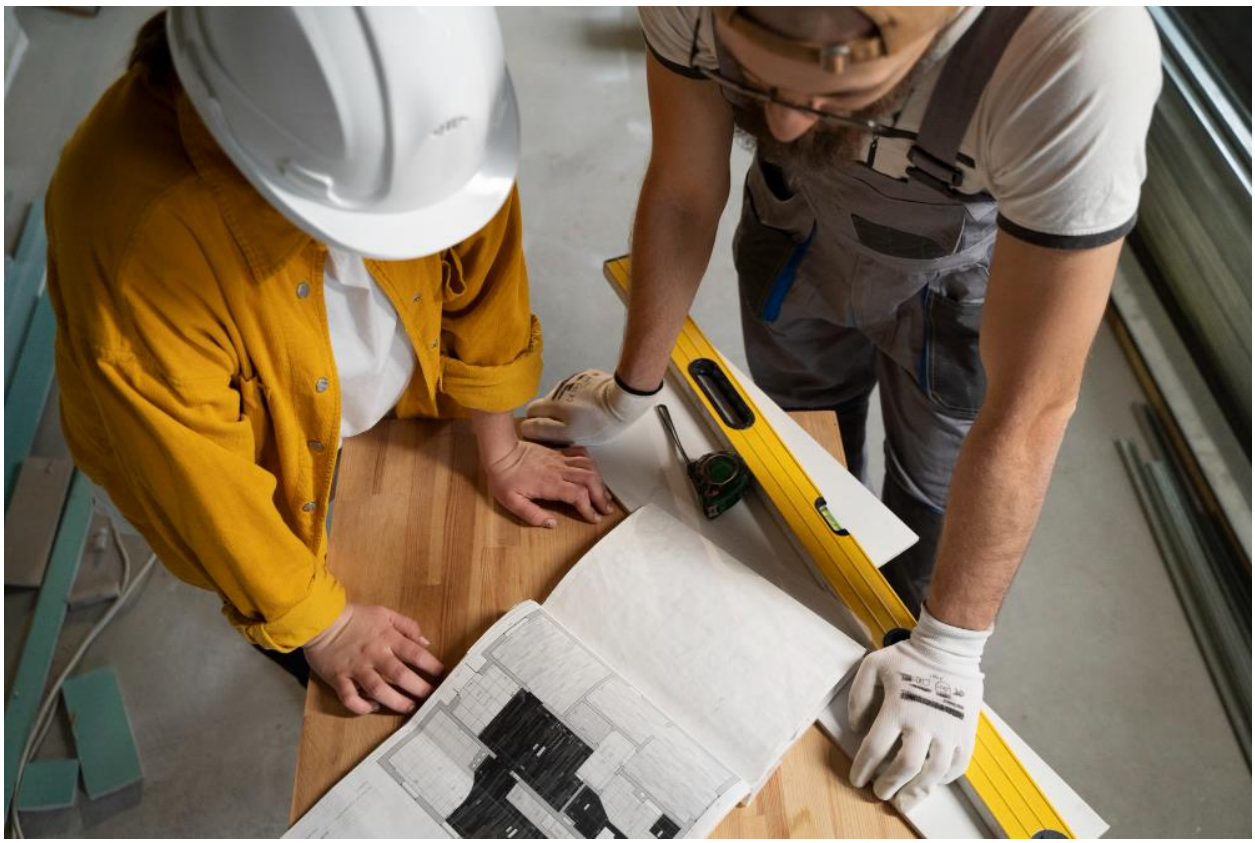
The development of construction software, a huge aspect of the industry, has high demand but less turn-up rate and quality services. This has led to the birth of Intellectsoft. If you’ve never heard of Intellectsoft, now you do. We are a software development partner for businesses worldwide. We also provide business with top-notch UI and UX design services.

With over a decade of experience and thousands of completed projects, we have put companies into the world market. Regardless of size and industry, our commitment has helped enterprises accelerate the adoption of new technologies and untangle complex issues that always emerge during digital evolution.

For construction companies, we have offered construction software development and are ready to offer more solutions that address technology trends. Below is the list of our sector-specific capabilities.

Our scope of services covers the arrangement of digital transformation webinars for beginners and professionals in the construction industry. All the solutions and supplementary information regarding our service and software development are provided in this video.

In need of a personal consultation? Ask our experts directly! We are always happy to discuss how to improve quality in construction projects, establish strategic goals and select the best software development approach that will benefit you.



From: https://www.intellectsoft.net/blog/8-emerging-construction-technology-trends/

✍ **After-text exercises**

I. Do a comprehension quiz:

Which technology is used to provide visualizations and remote site inspections?

a) 4D Simulation
b) Augmented Reality (AR)
c) Blockchain
d) Digital Twin

2. What role does blockchain play in construction?

a) It provides 3D printing capabilities.
b) It offers VR simulations for engineers.
c) It manages transactions and procurement.
d) It provides aerial imagery.

3. A technology that simulates building prototypes to test real-world conditions is known as:

a) Digital Twin
b) 4D Simulation
c) Fabrication
d) Laser Scanning

4. Which of the following software tools is associated with Building Information Modeling (BIM)?

a) Revit
b) Tekla
c) Plannerly
d) All of the above

5. Which technology allows construction teams to scan real-world objects for mapping and inspection?
a) Digital Twin
b) 3D Laser Scanner
c) Blockchain
d) 4D Simulation

6. Which technology can reduce building costs by up to 90 percent, as noted for 2022?
a) Augmented Reality (AR)
b) Digital Twin
c) Procurement
d) ISO19650

7. The ISO19650 standard is related to which technology in the construction industry?
a) Blockchain
b) Digital Twin
c) BIM (Building Information Modeling)
d) Laser Scanning

8. Which of the following terms refers to the process of manufacturing structures by assembling materials layer by layer?
a) Fabrication
b) Procurement
c) 4D Simulation
d) Interoperability

9. A practical application of 3D laser scanning technology was demonstrated in the renovation of which hospital?
a) NHS Nightingale Hospital
b) Mayo Clinic
c) Aiguilles-Queyras Hospital Center
d) Quintain Wembley Project

10. What is the purpose of interoperability in construction software?
a) To print 3D models of buildings
b) To enable different software platforms to work together
c) To reduce physical labor onsite
d) To monitor air quality

2.Answer the questions:

1) How has augmented reality (AR) impacted construction site inspections and safety measures?

2) Why is blockchain technology beneficial for managing transactions in construction projects?
3) In what ways does the digital twin technology improve building performance analysis?
4) Explain how 3D laser scanners contribute to the accuracy of construction planning and project inspections.
5) What are some advantages of using 4D simulation in construction project management?
6) Describe the role of Building Information Modeling (BIM) in construction and list some of its applications.
7) How does interoperability between construction software platforms benefit architecture, engineering, and construction (AEC) professionals?

3.Insert the appropriate construction technology:

1) …… technology helps provide visualizations and improve **remote site inspections** in the construction industry.
2) With the implementation of…….., construction companies can manage **transactions** and **procurement** securely and efficiently.
3) …… uses real-time data and **simulation** to create a virtual model that reflects the physical characteristics and performance of a structure.
4) **……..** are widely used for **on-site surveying**, mapping, and inspection, providing accurate data for **construction planning**.
5) **…….** allows construction teams to save **time** and **cost** by optimizing project schedules and visualizing progress over time.
6) **……..** enables the creation of **precise digital models** that architects and engineers can use for **design** and project coordination.
7) ……. in construction software allows different platforms to work together seamlessly, benefiting **AEC professionals** in planning and **collaboration**.

4.Match the words with their definitions:

Term	**Definition**
1.Augmented Reality	a) A virtual model that simulates real-world structures and conditions for performance analysis.
2.Blockchain Technology	b) Technology used for providing visualizations and improving safety on construction sites.
3.Digital Twin	c) A digital record-keeping method involving linked blocks for secure transaction management.
4.3D Laser Scanner	d) Enables precise digital models for design, project coordination, and resource management.
5.4D Simulation	e) Scans real-world objects for data on project inspection and construction planning.

6.Building Information Modeling (BIM)	f) Technology that allows visualization of project timelines and task progression.
7.Drones	g) Offers real-time aerial imagery and data collection for construction site monitoring.
8.Interoperability	h) Compatibility between construction software platforms for efficient collaboration.
9.Virtual Reality	i) Creating immersive environments to aid in design and stakeholder presentations.
10.Cost Estimation	g) Process of predicting the financial resources needed for a project before it begins.

5. **Speaking: choose one technology and speak on it.**
6. **Writing.** Write a technical report on the sample. Write a report of 250–300 words that includes:

1. **Description of the Object**: Summarize the building's general information.
2. **Analysis of the Condition of Structures**: Assess the extent of damage to the foundation, walls, roof, and utilities.
3. **Detection of Defects**: Highlight the critical structural and utility failures caused by the missile strike.
4. **Conclusions and Recommendations**:
    - State whether the building is repairable or should be demolished.
    - Propose immediate safety measures and potential strategies for reconstruction or clearance.

UINIT 13. TYPES OF BUILDINGS
THEORETICAL PART
MAKING A CONSTRUCTION SCHEDULE

Read and check your understanding.

A construction schedule is a timeline for every task and event in a construction project. The construction schedule is a fundamental part of the project planning phase, as it also defines the resources needed and the teams responsible for each task in the construction process.

5 Steps to Make a Construction Schedule

If you follow these five steps, you'll hit the major points that need addressing when creating a construction project schedule.

1. Get Info and Tools

Construction scheduling involves different types of resources, stakeholders and participants. Begin by listing all subcontractors involved in the job as there are always many in a construction project. Once you have the list, reach out to them and ask how much time it'll take to procure materials. Then, ask how long their part of the project is estimated to take. This is key for sound time estimation on your part.

You'll also need to speak with the local code office and get a list of requirements and what inspections will be needed throughout the build. Code restrictions vary depending on the type of construction and materials you'll be using, so you'll need to research to make sure your project is compliant.

When it comes to budgeting your project, you'll need to go through the process with your bank and determine when they'll release funds. You'll need a steady influx of cash to keep the project moving forward, so before it starts, it's key to have an understanding of your bank and its process of disbursing money. Talking to the bank before scheduling gives them a big-picture view of the project and valuable insight into how to schedule.

Determine a project management tool that'll suit your needs. Some templates can help you get started with your construction schedule if you don't want to build your plan and schedule from scratch. Naturally, ProjectManager being an online project management software recommends an online tool. But we'll get to those benefits in full later.

Related: 13 Best Construction Scheduling Software of 2024

2. Collect and Prioritize Tasks within the Construction Schedule

You have context and tools, but now you need to break the project down into the steps that'll lead it from a construction plan to a completed project. These are the tasks. You can't have an accurate construction schedule until you have a thorough listing of every task that must take place to end with a successful construction.

You can use a work breakdown structure (WBS) to get a handle on the size and scope of your project. You can think of this tool as a way to visualize your deliverables by starting with whatever you're going to construct and then breaking it down level by level until you're at the most basic parts.

At this point, it doesn't hurt to gather the team and your subcontractors to pick their brains. Remember, the more thorough your task list, the more accurate your construction schedule. Tasks are what can derail a project, so keep your mind on the scope. And don't forget that some tasks are dependent on others, so you'll want to link those.

Once you have your task list as complete as possible, you'll next need to put those tasks in order. The WBS can help with this, as it takes a complex project and boils it down to the essential parts and when they need to be worked on. You can use Gantt chart software to spread these tasks over a project timeline. We'll get into more detail on that in a bit.

Small tasks help to break up the project into larger phases or milestones. A milestone is a point in the project that marks the end of some large phase, say cementing the foundation or adding electrical. Accurately assessing the different tasks and milestones that make up your project is critical for effective construction scheduling.

3. Add Duration to Tasks

Now take each of the tasks and give them a start and finish date, which creates a bar chart on the Gantt chart that represents the duration of the task. These determinations must be realistic. A construction schedule is impacted by climate and weather forecasts are only so accurate, especially long-term. Look at historical data about the weather to get an estimation of how the climate might impact the work.

Depending on how long-term the project is, you'll need to calculate your construction schedule holidays and consider sick and vacation days for employees. If there are other seasonally related or personal issues that might come up, be sure to use them as a ruler when measuring your schedule's duration.

Outside of those issues, there's working with subcontractors and suppliers. The specifics are outlined in your contract, but more often than not those dates are subject to change. It's best for your construction schedule to have the wiggle room to accommodate fluctuations.

It's important to make the schedule realistic. You might want it done at a certain date, but to achieve that goal, you might be tempted to cut corners and sacrifice quality. This isn't possible in construction. The repercussions are too serious. So, be honest with yourself and give everything enough time in your construction schedule to be completed correctly.

Don't neglect non-task-related scheduling, such as procurement, delivery and other sources that are crucial to the project. You need to have a clear picture of what to order or reorder supplies. It's as important as the build. So is scheduling in any inspections, so there's time in your schedule to respond to any code issues.

There's also the financial portion of the project to keep in mind when scheduling. Add the bank draws and link them to the appropriate tasks in your construction schedule. You and the bank need to know when money will be required. The last thing you want is to chase the cash and stall the project.

4. Allocate and Execute Resources Across Your Construction Project

In a nutshell, construction scheduling is about activities and resources. Tasks won't get done by themselves, of course, but allocating that work to teams can get confusing in your construction schedule with so many subcontractors to oversee. By color-coding tasks, you can easily distinguish the different teams and work. Now you can pinpoint who's working on what once the project execution phase begins.

You should've already made estimations on the length of work from your teams and have a detailed profile of their skills and experience to assign them appropriately. After allocating your resources, a project management tool like ProjectManager can send alerts when new tasks are assigned and deadlines are due.

Once you have the people assigned to the work, the construction schedule is ready to venture into the real world. Make sure that your resources are balanced. You don't want to over-allocate one team while another is twiddling its thumbs. ProjectManager has workload calendars to help with this process.

5. Review, Review, Review

Construction scheduling is highly complex and requires permanent monitoring. No construction schedule is written in stone, at least none that will succeed. Things change, and if you're not monitoring and reviewing throughout the project, those changes will send you off track—or worse.

You'll need to look over the construction schedule throughout all project phases to make sure your actual progress aligns with your plan. Look at your schedule daily and depending on your time, update frequently. You can use our construction daily report template to keep track of the progress of your construction project.

This is a matter of time management. If you find that a daily update takes you away from other project issues and responsibilities, then maybe you need to set aside time each week to respond to the changes you've noted daily and apply them to the schedule. Monitoring and adjusting your construction schedule as on- and off-site issues arise is perhaps the most important aspect of keeping your project on schedule.

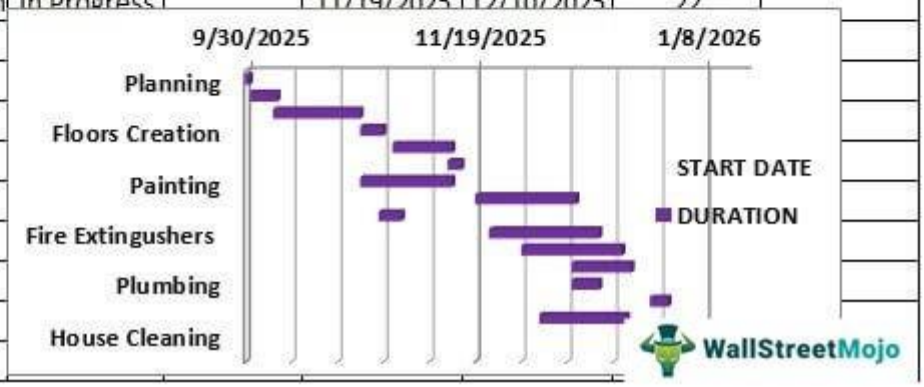
From: https://www.projectmanager.com/blog/make-a-construction-schedule

Construction Schedule Template

Project Name: Strart Date: Total Duration:

Project Manager: End Date:

TASK DESCRIPTION	STATUS	ASSIGNED	START DATE	END DATE	DURATION	COMMENTS
Planning	Complete		9/21/2025	9/30/2025	10	
Raw Material Accumula	Complete		10/1/2025	10/6/2025	6	
Basement Creation	Complete		10/6/2025	10/24/2025	19	
Floors Creation	Complete		10/25/2025	10/29/2025	5	
Light Fittings	Complete		11/1/2025	11/13/2025	13	
Sewage Pipelines	Complete		11/13/2025	11/15/2025	3	
Painting	In Progress		10/25/2025	12/5/2025	20	
Accessories Installation	In Progress		11/19/2025	12/10/2025	22	
AC Installation						
Fire Extingushers						
Parking Space						
Appliances						
Plumbing						
Final Inspections						
Wrap up						
House Cleaning						
Complete						



SELF-ASSESSMENT

1. Why is it important to speak with subcontractors before creating a construction schedule?
   a) To finalize the project budget
   b) To determine how long their tasks will take and ensure accurate time estimation
   c) To gather a list of code requirements from the local office
   d) To decide which subcontractors to hire
2. What tool is useful for breaking down a project into smaller tasks?
   a) Gantt chart
   b) Work Breakdown Structure (WBS)
   c) Daily report template
   d) Scheduling software
3. What is a key factor to consider when estimating task durations?
   a) The subcontractors' availability
   b) Climate and historical weather data
   c) The number of subcontractors involved
   d) The total project budget
4. How can you balance resource allocation effectively in a construction schedule?
   a) Assign more tasks to faster workers
   b) Use color-coding to distinguish teams and tasks

c) Prioritize resource allocation based on the project budget
d) Ensure all tasks have the same start and finish dates

5. Why is reviewing the construction schedule regularly important?
a) To ensure subcontractors follow instructions
b) To finalize contracts with suppliers
c) To monitor progress and respond to changes effectively
d) To create daily progress reports

PRACTICAL PART

I.Preparation

Before reading study the following vocabulary:

Sustainability
Hygienic
Amenities
Corrugated
Procurement
Durability
Accessibility

II.Reading Text

Types of buildings

Buildings can be categorized into three main types based on their usage: residential, commercial, and industrial. Each type of building serves a different purpose and has unique features.

1. Residential Buildings

Residential buildings are designed for people to live in. They can be single-family homes or residential apartments. The building in the image above is J Park by Aashish Group and if you are looking for flats in Jaipur then you should definitely check it out once. These buildings are typically built with comfort and privacy in mind. They often feature amenities such as kitchens, bathrooms, and living areas. Residential buildings can be made of a variety of materials, including wood, brick, steel, and concrete. At Dhinwa Construction & Engineering, we specialize in constructing high-rise residential buildings and our past projects are a testament to our expertise in the construction industry.

2. Commercial Buildings

Commercial buildings are designed for businesses to operate in. They can be office buildings, retail stores, or restaurants. These buildings are typically built with functionality and accessibility in mind. They often feature large open spaces, multiple floors, and parking areas. Commercial buildings can be made of a variety of materials, including steel, glass, and concrete. Over the years, **we have worked** on the construction of a number of commercial buildings and thus when it

comes to building them, we are among the very few who can actually construct and deliver a commercial building within your budget and stipulated time.

3. Industrial Buildings

Industrial buildings are designed for manufacturing and production. They can be factories, warehouses, or distribution centers. These buildings are typically built with durability and efficiency in mind. They often feature large open spaces, high ceilings, and loading docks. Industrial buildings can be made of a variety of materials, including steel, concrete, and corrugated metal. If you are looking for a construction contractor with **expertise in building factories**, you should definitely **get in touch** with our team of experts.

4.Educational Facilities

Educational facilities are buildings designed for teaching and learning. They can range from small schools to large universities. These buildings are equipped with classrooms, laboratories, libraries, and other facilities that are essential for education. Educational facilities are designed to provide a safe and conducive environment for learning. We provide our services for **school building construction** as well so In case if you are interested, let's get in touch and see how we can help you create a sturdy and practical school building.

5. Healthcare Facilities

Healthcare facilities are buildings designed for the provision of healthcare services. They can range from small clinics to large hospitals. These buildings are equipped with examination rooms, operating rooms, laboratories, and other facilities that are essential for healthcare. Healthcare facilities are designed to provide a safe and hygienic environment for patients and healthcare providers. We are very well known as a **respected hospital builder firm** in the Jaipur region and beyond.

6.Green Buildings

Green buildings are designed to reduce the negative impact on the environment and promote sustainability. They are constructed using environmentally friendly materials and technologies that minimize energy consumption and waste production. Green buildings also incorporate features that improve indoor air quality, water efficiency, and overall occupant health and comfort.

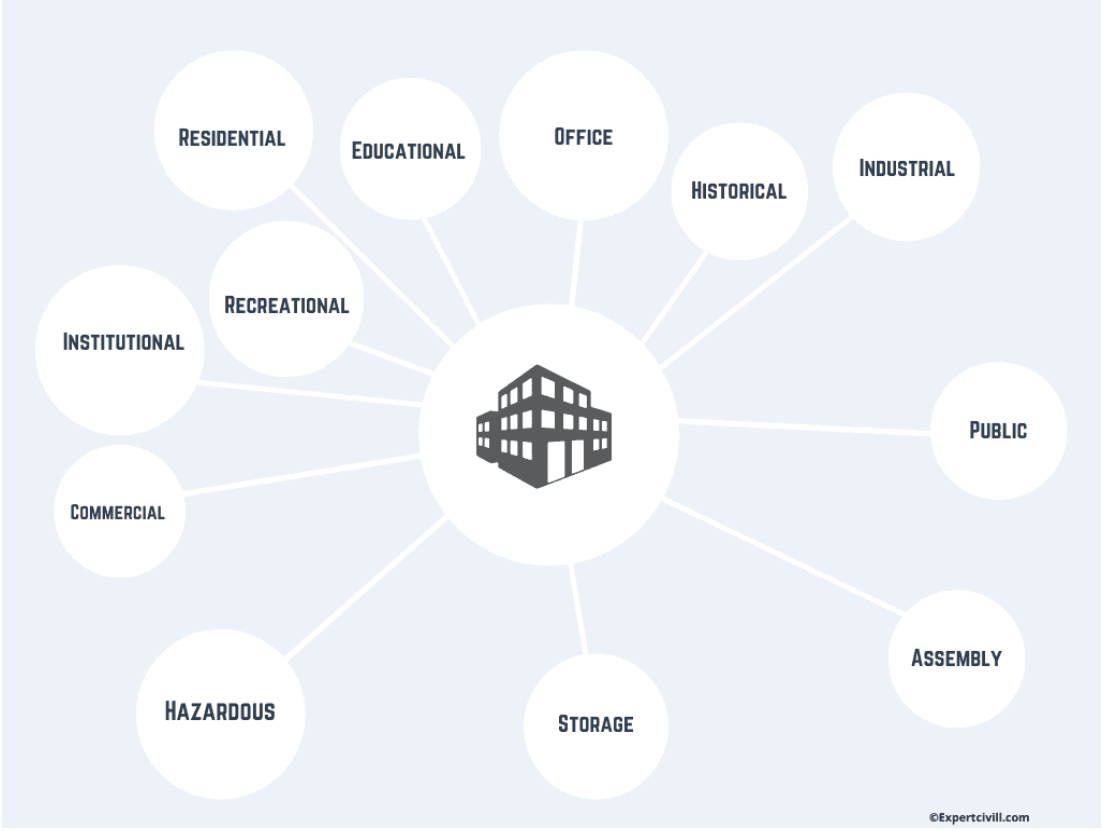
7.Governmental Buildings

Government buildings are buildings designed for the provision of government services. They can range from small offices to large complexes. These buildings are equipped with offices, meeting rooms, and other facilities that are essential for government operations. Government buildings are designed to provide a secure and accessible environment for government officials and the public.

8.Hotel Buildings

As the name suggests, hotel buildings are those that provide a safe housing to run a hotel. It can be anything from low to a high-rise building in terms of its size with multiple floors, and steel as well as glass structure at different levels. We are specialist of building hotel building and we would love to get in touch with you to help you build a hotel that turns eyeballs no matter how many times has anyone seen it.

Overall, specialized buildings are designed to meet specific needs and requirements. They play an important role in society by providing essential services to the public.



✍ After-text exercises

1. Do a comprehension quiz:

1. What is the primary purpose of residential buildings?
   a) To provide spaces for businesses to operate
   b) To manufacture and produce goods
   c) To provide living spaces for people
   d) To promote sustainability
2. Which feature is commonly associated with commercial buildings?
   a) High ceilings and loading docks
   b) Kitchens and bathrooms
   c) Large open spaces and parking areas
   d) Classrooms and laboratories
3. What type of building is designed for manufacturing and production?
   a) Green buildings
   b) Industrial buildings
   c) Governmental buildings
   d) Hotel buildings
4. What facilities are essential in educational buildings?

a) High ceilings and open spaces
b) Operating rooms and laboratories
c) Classrooms, libraries, and laboratories
d) Parking areas and offices

5. What is the main goal of green buildings?
   a) Maximizing profits for businesses
   b) Reducing environmental impact and promoting sustainability
   c) Providing spaces for government operations
   d) Constructing large residential complexes
6. Healthcare facilities are equipped with which of the following?
   a) Meeting rooms and offices
   b) Classrooms and libraries
   c) Examination rooms and operating rooms
   d) High ceilings and large docks
7. Governmental buildings are designed to:
   a) Reduce energy consumption and waste production
   b) Provide a secure and accessible environment for government operations
   c) Support large-scale manufacturing activities
   d) Offer accommodations for travelers
8. Hotel buildings are designed to:
   a) Promote sustainability and environmental health
   b) Support education and research activities
   c) Provide accommodations for travelers with multiple floors and modern designs
   d) House government officials and their offices
9. Which type of building is specifically designed to host hotels?
   a) Residential buildings
   b) Commercial buildings
   c) Hotel buildings
   d) Industrial buildings
10. Which of the following materials is commonly used in constructing green buildings?
   a) Corrugated metal and steel
   b) Environmentally friendly materials
   c) Brick and wood
   d) Concrete and glass

2. Answer the questions:

1) What are the key differences between residential and industrial buildings in terms of purpose and design?
2) Why is sustainability an important consideration in the construction of green buildings, and how does it impact their materials and features?
3) What factors should be considered when designing educational facilities to ensure they provide a safe and effective learning environment?

4) How do the materials and structural requirements for healthcare facilities differ from those of commercial buildings?
5) In your opinion, what makes hotel buildings stand out in terms of architectural design and functionality compared to other building types?

3. True/false:

1) Industrial buildings are primarily designed for business operations and often include multiple floors and parking spaces.
2) Healthcare facilities must adhere to strict hygiene and safety requirements to ensure a safe environment for patients and staff.
3) Green buildings are constructed using environmentally friendly materials and technologies that promote energy efficiency.
4) Educational facilities typically feature amenities such as high ceilings and loading docks for efficiency.
5) Hotel buildings are designed to provide temporary accommodations and often include lobbies, restaurants, and multiple floors.

4. Watch a video https://www.youtube.com/watch?v=sSk0s6S24Qg&ab_channel=BuildingStudies Complete the table summarizing information:

Type of building	Materials	Requirements	Purpose	Common features
Residential	Wood, brick, steel, concrete	Comfort, privacy, compliance with local codes	Housing for individuals/families	Kitchens, bathrooms, living areas
Commercial				
Industrial				
Educational				

5. Role play. *You are a construction project manager meeting with a team of subcontractors to finalize the project schedule for a new commercial building. Discuss each step of the schedule creation process. The PM facilitates by asking each role-specific questions, ensuring all aspects (tasks, durations, resources, and reviews) are covered.*

UNIT 14. ADAPTIVE CITIES

THEORETICAL PART
WRITING SUSTAINABLE BUILDING DESIGN REPORT

Sustainable building design integrates environmentally friendly principles into construction projects to reduce their ecological impact while improving energy efficiency, comfort, and long-term viability. This report outlines the core strategies, benefits, and practical implementations of sustainable building design, focusing on energy efficiency, material selection, and waste management.

Key Strategies in Sustainable Building Design

1 Energy Efficiency

- **Design for Passive Solar Gain:** Orient buildings to maximize natural light and reduce reliance on artificial lighting.
- **Energy-Efficient HVAC Systems:** Install heating, ventilation, and air conditioning systems with high energy ratings.
- **Renewable Energy Sources:** Incorporate solar panels, wind turbines, or geothermal heating systems to generate sustainable energy.

2 Material Selection

- **Eco-Friendly Materials:** Use recycled, renewable, or locally sourced materials such as bamboo, recycled steel, or reclaimed wood.
- **Low-Impact Insulation:** Choose non-toxic, energy-efficient insulation materials like cellulose or sheep's wool.
- **Green Concrete:** Utilize concrete alternatives or mixes that include industrial by-products like fly ash to lower the carbon footprint.

3 Water Efficiency

- **Rainwater Harvesting:** Install systems to collect and reuse rainwater for non-potable applications such as irrigation.
- **Low-Flow Fixtures:** Use water-saving faucets, showers, and toilets.
- **Graywater Recycling:** Reuse wastewater from sinks and baths for landscaping or flushing toilets.

4 Waste Management

- **Construction Waste Reduction:** Implement a waste management plan to recycle and reuse materials during construction.
- **Lifecycle Planning:** Design buildings with disassembly and material reuse in mind.

5 Indoor Environmental Quality (IEQ)

- **Ventilation Systems:** Improve air quality by using advanced ventilation systems that limit pollutants.
- **Non-Toxic Finishes:** Avoid paints, sealants, and adhesives with volatile organic compounds (VOCs).
- **Natural Light and Views:** Enhance occupant well-being by maximizing access to daylight and outdoor views.

SELF-ASSESSMENT

1. **What is the purpose of designing a building for passive solar gain?**

a) To reduce the number of windows in the building
b) To maximize natural light and minimize reliance on artificial lighting
c) To ensure buildings retain more heat in the summer
d) To make the building more visually appealing

2. Which of the following is NOT an eco-friendly material commonly used in sustainable building design?

a) Bamboo
b) Recycled steel

c) Plastic insulation foam
d) Reclaimed wood

3. What is the primary benefit of rainwater harvesting in sustainable building design?

a) Reducing the use of potable water for non-potable applications
b) Increasing groundwater levels
c) Cleaning water for drinking purposes
d) Preventing roof damage from rainfall

4. Why is lifecycle planning important in waste management for sustainable buildings?

a) To reduce construction costs by skipping inspections
b) To design buildings for easy disassembly and material reuse
c) To extend the construction timeline
d) To ensure compliance with traditional building codes

5. Which feature improves indoor environmental quality (IEQ)?

a) Low-flow water fixtures
b) Solar panel installations
c) Non-toxic finishes and advanced ventilation systems
d) Use of green concrete in the foundation

PRACTICAL PART

I.Preparation

Before reading study the following vocabulary:

Beacon
Sustainable
Heat exchangers
Vacuum collectors
Sound-insulated
Photovoltaic panels
Aquifer thermal energy storage
Passive design
BREEAM certification
Futureproof

II.Reading Text

Green buildings in Europe

Marco Polo Tower by Behnisch Architekten, Hamburg, Germany

The 55-meter-tall tower serves as a beacon for the nearby Cruise Ship Terminal and the Promenade on Strandkai, It is a distinctive and extraordinary sculptured building centred on delivering opulent living quarters and an all-encompassing sustainable green building design. Additional sunshades are not required because of the overhanging terraces above, that provide shade to the recessed façades from the sun's direct rays.

This building implements strategies like **conversion of heat into cooling for the apartments utilizing heat exchangers** and vacuum collectors on the roof. Innovative sound-insulated air louvres allow for natural airflow in the sleeping spaces without adding to outside noise pollution.

CopenHill by Bjarke Ingels Group, Copenhagen, Denmark

The enormous project, which had a budget of 3.5 billion Danish kroner, was at one point the **greatest environmental endeavour in Denmark**. Its construction set a precedent for community involvement and context integration. The 41,000 m2 proposal transforms the infrastructure into an architectural monument for the city by including an urban recreation centre and an **environmental teaching centre that attracts citizens to appropriate the space.**
Furnaces, steam, and turbines beneath the sloping roof transform 440,000 tons of trash annually into clean energy to provide **150,000 homes with heating and power**. Aluminium bricks that are 1.2m high by 3.3m broad and arranged like enormous bricks overlapping each other make up the continuous façade of CopenHill

The Edge by PLP Architecture, Amsterdam, The Netherlands

Having the highest BREEAM rating for an office building, **The Edge is a landmark for The Netherlands' sustainability efforts**. It is a 40,000m2 office building in Amsterdam's Zuidas business district that was created for the global financial firm Deloitte.

It incorporates numerous smart technologies to create adaptable and intelligent workspaces, some of them are below:

● Incorporating an array of photovoltaic panels in the roof and the south-facing facade, the largest amount of solar panels of any European office building.

● All of the energy required for heating and cooling is provided by an aquifer thermal energy storage system.

● Each luminaire individually within the building is computer controlled by a system created by PHILLIPS, reducing the energy consumption by 50% compared to TL-5 Lighting.

● Passive design that creates unique facades that take advantage of their orientation. Each facade accommodates its design to respond to the amount of sunlight, whether by including solar panels, using louvres to provide shade, or including thicker glass to dampen noise from the exterior.

With these strategies, **The Edge uses 70% less electricity than other office buildings**,This building received BREEAM certification to assess the most innovative aspects of its design and construction. The building's overall concept has always been to be exemplary, to stand out as a futureproof office that raises standards in the Netherlands as well as internationally

From: https://www.novatr.com/blog/green-building-projects

✍ **After-text exercises**

1. Do a comprehension quiz

1. **What is the purpose of a "beacon" as described in the text?**
   a) A device for cooling buildings
   b) A landmark or guiding signal
   c) A sustainable energy source
   d) A type of façade design

2. What does "BREEAM certification" evaluate?
a) Architectural aesthetics
b) Environmental performance and sustainability
c) Cost-efficiency in construction
d) Noise insulation techniques

3. What do "photovoltaic panels" primarily do?
a) Convert heat into cooling energy
b) Generate electricity from sunlight
c) Provide noise insulation
d) Store thermal energy underground

4. What is the function of "heat exchangers"?
a) They cool air using natural airflow.
b) They convert sunlight into energy.
c) They transfer heat between systems to provide cooling or heating.
d) They dampen noise from external sources.

5. What is "passive design" in the context of building construction?
a) Using materials that absorb maximum sunlight
b) Designing façades that adapt to environmental conditions for efficiency
c) Incorporating advanced sound-proofing systems
d) Installing solar panels on all sides of a building

6. What are "vacuum collectors" used for in the building?
a) Cleaning interior spaces efficiently
b) Collecting trash for energy transformation
c) Harnessing solar energy for cooling or heating
d) Storing thermal energy underground

7. What benefit do "sound-insulated" louvres provide?
a) Better energy efficiency
b) Natural airflow without external noise interference
c) Reduced maintenance costs
d) Improved solar energy capture

8. What does it mean if a building is described as "futureproof"?
a) It is resistant to earthquakes.
b) It incorporates technologies and designs suitable for future needs.
c) It cannot be damaged by external elements.
d) It will never require maintenance.

2. Answer the questions:

1) How does the overhanging terrace design contribute to the sustainability of the building?
2) What strategies does CopenHill use to transform waste into clean energy?
3) How do aquifer thermal energy storage systems improve energy efficiency in The Edge building?
4) In what ways do passive design features optimize the performance of The Edge?
5) Why is BREEAM certification significant for evaluating modern buildings?

3. True/false:
1) The recessed façades of the 55-meter-tall tower require additional sunshades.
2) CopenHill transforms 440,000 tons of trash annually into heating and electricity for homes.
3) The Edge building uses solar panels on its roof and north-facing façade.
4) Sound-insulated louvres in the tower allow natural airflow without adding noise pollution.
5) BREEAM certification assesses a building's compliance with local safety regulations.

4.Match the words with their definitions:

Words	**Definitions**
1.Beacon	a) Devices that convert sunlight into electricity

Words	Definitions
2.Photovoltaic panels	b) A building approach that uses natural features and orientation to improve energy efficiency
3.Passive design	c) Designed to remain relevant and functional in the future, often by incorporating adaptable technologies
4.Heat exchangers	d) Solar energy systems that use vacuum tubes to convert sunlight into heat
5.Sustainable	e) An assessment method that measures the sustainability and environmental impact of buildings
6.BREEAM certification	f) A method of storing thermal energy in underground water reservoirs
7.Aquifer thermal storage	g) Designed to prevent or reduce the transmission of noise
8.Futureproof	h) A landmark or guiding signal, often used for navigation or inspiration
9.Sound-insulated	i) Capable of being maintained over time without depleting resources or causing harm to the environment
10.Vacuum collectors	g) Systems that transfer heat between two media for cooling or heating

5. Speaking. Speak on sustainable construction in Singapore (or any other country)

6. Writing. Imagine you are an architect tasked with designing a sustainable residential building for an urban environment. Write a 150-200 word proposal describing:

1. **Three sustainability features** you would incorporate and their benefits.
2. How your design would enhance the quality of life for residents.
3. The challenges you might face in implementing your design and possible solutions.

Example **Start:**
"Our proposed residential building will prioritize sustainability and energy efficiency to set a benchmark in urban architecture. The first feature will be photovoltaic panels integrated into the roof and south-facing façades to harness solar energy, providing up to 70% of the building's electricity needs..."

Final Test

1. **Which of the following is a common characteristic of traditional brick construction?**
    - A) High insulation properties
    - B) High thermal mass
    - C) Low cost and quick installation
    - D) Sustainability
2. **What is the primary advantage of using bamboo as an alternative construction material?**
    - A) Durability and strength
    - B) Sustainability and rapid growth
    - C) Low cost
    - D) Water resistance
3. **Which of the following is a key disadvantage of using straw bale construction?**
    - A) High thermal conductivity
    - B) Vulnerability to moisture
    - C) High cost
    - D) Limited availability
4. **What type of material is commonly used in eco-friendly building designs to reduce energy consumption?**
    - A) Concrete
    - B) Timber
    - C) Insulating concrete forms (ICFs)
    - D) Brick

5. **Which of the following is a key feature of a passive house design?**
    - A) Large windows for natural lighting
    - B) Active solar panels for energy generation
    - C) Use of renewable energy sources
    - D) High insulation and airtightness
6. **What is a green roof primarily designed to do?**
    - A) Increase aesthetic appeal
    - B) Improve thermal performance and manage stormwater
    - C) Reduce air pollution
    - D) Provide recreational space
7. **Which renewable energy source is often integrated into sustainable buildings for heating and cooling?**
    - A) Geothermal
    - B) Wind
    - C) Nuclear
    - D) Hydroelectric
8. **What is the LEED certification used for?**

- A) Measuring building height
- B) Ensuring energy efficiency
- C) Certifying sustainable construction practices
- D) Monitoring indoor air quality

9. **Which of the following technologies is most commonly used for 3D printing of buildings?**
   - A) Steel reinforcement
   - B) Concrete-based materials
   - C) Prefabricated panels
   - D) Carbon fiber
10. **What is the primary function of Building Information Modeling (BIM) in modern construction?**
   - A) To create digital simulations of buildings
   - B) To calculate construction costs
   - C) To manage project schedules
   - D) To ensure structural integrity
11. **Which of these innovations helps reduce construction waste?**
   - A) Prefabrication
   - B) Manual labor
   - C) Traditional bricklaying
   - D) Heavy machinery use
12. **What is the concept of "smart buildings"?**
   - A) Buildings with automated systems for energy, security, and comfort
   - B) Buildings that are easy to build and cheap
   - C) Buildings that require no maintenance
   - D) Buildings that are entirely made of glass

13. **What is a high-rise building?**
   - A) A building with fewer than five stories
   - B) A building with more than 10 stories
   - C) A building constructed primarily with timber
   - D) A building with a single floor for residential use
14. **Which type of building is primarily used for manufacturing or production purposes?**
   - A) Commercial building
   - B) Industrial building
   - C) Residential building
   - D) Institutional building
15. **Which type of building is typically constructed to house schools, hospitals, or other public service institutions?**
   - A) Industrial
   - B) Commercial
   - C) Institutional

- D) Residential

16. **What distinguishes a sustainable or “green” building from a traditional building?**
    - A) The use of non-renewable materials
    - B) The use of traditional construction methods
    - C) Focus on energy efficiency, renewable materials, and minimizing environmental impact
    - D) The aesthetic design

17. **What is the primary purpose of a technical inspection report in construction?**
    - A) To evaluate the design of the building
    - B) To assess the financial feasibility of a project
    - C) To identify safety, quality, and structural issues during construction
    - D) To ensure the building meets aesthetic standards
18. **Which of the following is most likely to be included in a technical inspection report?**
    - A) Market demand analysis
    - B) Site survey and land use restrictions
    - C) Recommendations for repairs or improvements
    - D) Color scheme of the building
19. **What is a key factor to consider when conducting a technical inspection of a building’s foundation?**
    - A) Energy efficiency of materials used
    - B) Stability and any signs of shifting or settling
    - C) Color and texture of the foundation material
    - D) The interior design
20. **Why is it important to conduct regular technical inspections during the construction process?**
    - A) To reduce the construction timeline
    - B) To ensure the project stays within budget
    - C) To detect potential risks early and avoid costly mistakes
    - D) To ensure the workers are following regulations strictly

APPENDICES

GLOSSARY OF CONSTRUCTION TERMS

1) A**coustic Insulation** – акустична ізоляція
2) **Alternative Construction Materials** – альтернативні будівельні матеріали
3) **Aerated Concrete** – газобетон
4) **Agricultural Building** – сільськогосподарська будівля
5) **Airtightness** – герметичність
6) **Amenities** - зручності
7) **Autonomous Construction Vehicles** – автономні будівельні машини
8) **Biodegradable Materials** – біорозкладні матеріали
9) **Biophilic Design** – біофільний дизайн
10) **Building Code** – будівельний кодекс
11) **Building Information Modeling (BIM)** – моделювання інформації про будівлю (BIM)
12) **Building Permit** – будівельний дозвіл
13) **Building Condition Assessment** – оцінка стану будівлі
14) **Building Envelope** – оболонка будівлі
15) **Carbon Sequestration** – секвестрація вуглецю
16) **Carbon Neutral Construction** – будівництво з нульовим викидом вуглецю
17) **Cladding** – обшивка
18) **Constructability** – здатність до будівництва
19) **Construction Waste Management** – управління будівельними відходами
20) **Cumulative Impact Assessment** – оцінка кумулятивного впливу
21) **Chilled Beam** – охолоджувана балка
22) **Circular Economy** – циркулярна економіка
23) **Code Violation** – порушення норм
24) **Concrete** – бетон
25) **Cork** – корок
26) **Creep** – повзучість (деформація матеріалу під навантаженням)
27) **Curtain Wall** – вітражна стіна
28) **Damproofing** – захист від вологості
29) **Earthquake-Resistant Design** – сейсмостійкий дизайн
30) **Epoxy Resin** – епоксидна смола
31) **Energy-Efficient** – енергоефективний
32) **Energy Recovery Ventilator (ERV)** – вентилятор для відновлення енергії
33) **Fiberglass Insulation** – скловолоконна ізоляція
34) **Foundation Inspection** – перевірка фундаменту
35) **Geothermal Heating** – геотермальне опалення
36) **Green Cement** – зелений цемент
37) **Green Building Standards** – стандарти «зеленого» будівництва

38) **Hardscape** – твердий ландшафт (доріжки, бетонні конструкції тощо)
39) **Hempcrete** – канабісний бетон
40) **High-Rise Building** – висотна будівля
41) **Hydronic Heating System** – гідравлічна система опалення
42) **Insulating Concrete Forms (ICFs)** – ізоляційні бетонні форми
43) **Integrated Design Process (IDP)** – інтегрований процес проектування
44) **Inspection Report** – звіт про перевірку
45) **Inspection Checklist** – контрольний список перевірки
46) **Load-Bearing Wall** – несуча стіна
47) **Load Capacity** – вантажопідйомність
48) **Lean Construction** – будівництво без втрат
49) **Lime** – вапно
50) **Low-Impact Development (LID)** – розвиток з низьким впливом
51) **Low-Rise Building** – низькоповерхова будівля
52) **Maintenance Plan** – план технічного обслуговування
53) **Mixed-Use Building** – багатофункціональна будівля
54) **Modular Construction** – модульне будівництво
55) **Natural Lighting** – природне осввітлення
56) **Net-Zero Building** – будівля з нульовим споживанням енергії
57) **Passive House** – пасивний будинок
58) **Passive Solar Heating** – пасивне сонячне опалення
59) **Photovoltaic Panel** – фотоелектрична панель
60) **Prefabrication** – передзбірка
61) **Pre-stressed Concrete** – попередньо напружений бетон
62) **Public Building** – громадська будівля
63) **Pre-fabricated Panels** – попередньо виготовлені панелі
64) **Precast Concrete** – збірний бетон
65) **Partition Wall** – перегородка
66) **Pitched Roof** – дах з ухилом
67) **Plinth** – постамент
68) **R-value (Thermal Resistance)** – коефіцієнт теплопровідності
69) **Rebar** – арматура
70) **Reinforced Concrete** – залізобетон
71) **Recycling** – переробка
72) **Recycled Materials** – перероблені матеріали
73) **Renewable Energy** – відновлювана енергія
74) **Residential Building** – житловий будинок
75) **Risk Assessment** – оцінка ризиків
76) **Self-Healing Concrete** – самовідновлювальний бетон
77) **Seismic Retrofitting** – сейсмічне укріплення
78) **Structural Damage** – структурні пошкодження
79) **Structural Integrity** – структурна цілісність
80) **Sustainable Building** – сталий будинок
81) **Sustainable Urban Drainage Systems (SUDS)** – сталий міський дренаж

82) **Tensile Strength** – межа міцності на розтягнення
83) **Textile Reinforced Concrete** – бетон, армований текстилем
84) **Thermal Bridging** – теплові мости
85) **Timber Frame Building** – будівля з дерев'яним каркасом
86) **Timber** – деревина
87) **Tensile Strength** – міцність на розтягнення
88) **Tiling** – облицювання плиткою
89) **Tiling Adhesive** – клей для плитки
90) **Vapor Permeability** – паропроникність
91) **Virtual Reality (VR)** – віртуальна реальність
92) **Zero-Waste Building** – будівля без відходів
93) **Virtual Reality (AR)** – доповнена реальність
94) **Vapor Barrier** – пароізоляція
95) **Wall Insulation** – стінова ізоляція
96) **Warehouse** – склад
97) **Waterproofing** – гідроізоляція
98) **Wind Turbine** – вітряна турбіна
99) **Urban Building** – міська будівля
100) **U-Value** – коефіцієнт теплопередачі

COMMON PHRASES USED IN ACADEMIC TEXTS

Актуальний up-to-date (важливий/популярний сьогодні), relevant, pressing, urgent (нагальний), …is/are of great

importance today, is/are currently of great interest (*типова помилка:* actual; *уникайте:* topical)

Актуальність significance, importance, relevance (*уникайте:* actuality, topicality)

Анотація abstract

Важливий significant, important

Визначити define (дати дефініцію), determine (дату тощо),

identify, indicate, outline, specify (особливості)

Виконувати (див. “здійснювати")

Виникнення the rise, emergence, appearance, origin (походження)

Висвітлити (тему, проблему) cover, describe, report on, highlight

Висновки conclusion

Виявити identify (визначити), show, find out, reveal, discover

(відкрити щось нове)

Відзначати note, stress (наголосити на ...)

Відповідний relevant

Вітчизняний (тобто український) Ukrainian (*типова помилка:* native, domestic)

Вплив impact (сильний вплив), effect (effects), influence (довготривалий)

Вивчено... The article explores (examines) … *Можливий варіант у пасивному стані:* ... is/are explored (examined)

Визначено особливості... The specific features of … are outlined

Визначити основну думку (причини) identify the main argument (the causes)

Висвітлено проблему ... The issue concerning … is highlighted

Виходячи з досвіду ... Judging by the experience of … On the basis of …

Виявлено... … is/are found out

Відповідно, ... Accordingly, …

В контексті ... within **(**in) the context of …, from the perspective of …, in relation to …

В умовах … in/under the conditions of …

Головну (основну) увагу приділено... Particular (special) attention is paid (drawn) to… The author focuses on …

Даний (цей) **...** this …, the present …, the current

Діяльність activities (*типова помилка:* activity, це – активність)

Дозволити (дати можливість) make it possible to …, enable, permit

Доповідь report

Дослідження research (наукове вивчення взагалі)**,** study

(конкретна наукова розвідка, наукова стаття), case study (конкретне дослідження)

Досліджувати study, analyze, explore, examine (*типова помилка:* research)

Досягнення (у значення "прогрес") advances in …

Детально описано … is/are described in detail

Доведено факт ... The author has established the fact that …

Доведено, що... it is shown that … The author shows (demonstrates) that … The author argues that …

Досліджено... The paper/author explores… (examines …, studies…, investigates…, describes …, considers …). *Можливий варіант у пасивному стані:* ... is/are explored (examined, etc.)

Зазначено, що... The author states (shows, points out, explains, indicates, develops the view) that … It is claimed that …

За цих умов (обставин) under these conditions (circumstances)

Звернути увагу на ... draw attention to …

Здійснене дослідження the study, this study (*типова помилка:* the conducted study)

Здійснювати дослідження conduct a study

Зображено... is shown (demonstrated)

З позиції ... from the standpoint of …

Зроблено спробу визначити .... An attempt is made at identifying (defining) …

Закономірності laws, regularities, a regular pattern

Застосовувати apply (метод, правило, теорию), use (використовувати: наприклад, матеріал)

Збірник (наукових праць) journal

Здійснювати perform (оцінювання), conduct (дослідження, аналіз)

Значення (важливість) importance, significance, implications, relevance

Зокрема more specifically, particularly

Ключові слова keywords (key words)

Коло проблем a number of issues, a whole range of, wide variety of

Конкретний specific, particular

Лежати в основі underlie

Наведено аналіз ... The article provides an analysis of … The article provides a detailed examination of …

Наведено дані про ... Data are given about …

Наведено приклади ... This article provides examples of … …gives examples showing…

Наведено характеристику... … is/are described

На підставі (на основі, на базі)... considering …, drawing on

…, proceeding from …, having analyzed …, … is based on …

На початку / наприкінці (80-х. рр. XX ст.) in the early / late 80s of the 20th century (1980s)

На прикладі (на матеріалі ...) the case of, by …ing, proceeding from, having analyzed …, … is based on …, using … as an example (*Типова помилка:* by the example of …)

На сучасному етапі at present

Наголошувати emphasize, stress

Назва (статті) (research paper) title

Напрям line, trend, direction, research area (напрям наукових досліджень), the main activities, the area of activities (напрям діяльності), policy

Обґрунтований justified

Обґрунтовувати justify**,** give a rationale for …, substantiate

Обґрунтування main arguments, justification, motivation

Обсяг (матеріалу, роботи) the scope

Огляд overview (огляд проблем), survey, the literature review (огляд літератури)

Окреслити (намітити) outline

Описати describe

Опитування survey

Основний main, principal, major, key

Особливості characteristic (specific, distinctive) features, characteristics (peculiarities означає "щось незвичне")

Охарактеризувати describe (описати, дати характеристику), identify (визначити), characterize as … (охарактеризувати як ...)

Охоплювати cover (певний обсяг роботи з наголосом на повноту охоплення), encompass (певні теми з наголосом на додатковий характер інформації)

Окреслено коло питань стосовно ... is/are … highlighted

Окреслено характерні риси... Characteristic features of … are outlined

Описано ... The paper/author describes (offers a description of…). *Або:* ... is/are described

Особливу увагу приділено ... Particular (special) attention is paid to… The paper concentrates on … focuses on ... Extensive coverage is given to … Much attention is given to …

Охарактеризовано... The author explores (describes, examines, analyzes)… is/are described (identified)

Питання (проблеми) issues, problems (*типова помилка:* questions)

Підхід до approach to

Повідомлення, повідомляти report

Показати show, demonstrate, indicate

Поняття concept

Попередні дослідження previous research, research publications

Постановка проблеми problem statement, research justification

Пояснення (наукове) interpretation

Пояснити explain, demonstrate, illustrate, argue, explicate, elucidate, interpret

Праця (наукова) study, paper, research publication, work (не про свою роботу)

Представити present, provide

Причина cause (те, що спричинило щось), reason (підстава, мотив)

Проаналізувати analyze, explicate

Проблеми problems (те, що потребує вирішення), issues (теми, що розглядаються)

Прокоментувати interpret (матеріал, дані)

Пропозиція suggestion (ідея для розгляду),

Пропонувати suggest (ідею для розгляду), offer (щось конкретне), propose

Піднімати питання ... raise the issue of …

Показано вплив... The influence (impact, effect) of … on … is shown

Показано значення... The importance (significance) of .. for …is stressed

Показано на прикладі (проілюстровано**) ...** is exemplified by

Пояснити на прикладі ... illustrate by …ing

Представлено огляд.... This paper presents a review of …

Проаналізовано особливості... characteristic (specific, distinctive) features of ... are analyzed. *Або:* The author analyzes … (presents/provides an analysis of …)

Проблему розглянуто шляхом ... The study investigates this issue by examining …

Проведено (здійснено) дослідження... (*див.* **Досліджено**)

Розв'язати проблему find a solution to the problem

Розглядаються проблеми.... The issues addressed are …

Розглянуто... (У статті розглянуто....) The paper deals with …This article discusses the issue of... The study is concerned with … The paper describes … The paper is concerned with … The author considers … *Або:* … is (are) described (discussed, considered, etc.)

Реалізувати ідею implement an idea

Результати results, findings, outcomes

Резюме (короткий виклад змісту статті) summary

Розглядати discuss, describe, consider, study, explore, cover, investigate, view (treat)… as … (розглядати щось як...) метод

Розкрити show, describe, find, demonstrate, explain, unfold, reveal (*помилка:* disclose)

Розробити develop (теорію), design (план)

Розробка research, study (наукова діяльність, праця), development, elaboration (ідеї)

Розуміння insight into… (розуміння наукове), scientific interpretation (розуміння проблеми)

Світогляд world-view, world outlook

Світоглядний world-view, relating to world outlook, philosophical, ideological

Соціокультурний socio-cultural

Специфіка specific features (nature, character) (*типова помилка:* specificity)

Спостерігати observe, study

Стан дослідження state of research

Стаття (наукова) article, paper, study

Стосовно relating to

Суттєвий considerable

Сучасне суспільство contemporary society

Сучасний present, present-day, current (нинішній), modern, up-to-date (такий, що відповідає вимогам часу), contemporary (того ж часу, про який ідеться)

Сучасність our time (*уникайте:* contemporaneity)

Систематизовано й узагальнено... … is/are systematized and summerized

Стаття присвячена питанням... The article is devoted to…

The article deals (is concerned) with… The paper touches upon the issue of… The study addresses the problems of … *уникайте:* dedicated to …)

Стисло описано ... is/are described in short

Сфера досліджень the field (area) of research

Творчість creative work (творча діяльність), works (доробок науковця, митця, письменника)

Тези доповідей conference reports, summaries, abstracts of reports

Тези доповідей (збірник) proceedings of the … conference

Тлумачення explanation

Узагальнити generalize (отримані результати), summarize (інформацію з попереднього досвіду, з прочитаної літератури)

Установити find out (з'ясувати), identify, demonstrate, prove

Установлено місце та роль... The position (place) and role of … are identified

Установлено факт … The author has established the fact that…

Уточнено... is/are specified

Характеристика (опис) description, outline

Характерний specific

Характерні риси (див. "особливості")

Явище phenomenon (множина: phenomena. *Типова помилка:* phenomenons)

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Навчально-методичне видання

Мосієвич Лариса Василівна

ПРОФЕСІЙНО-ОРІЄНТОВАНИЙ ПРАКТИКУМ ІНОЗЕМНОЮ МОВОЮ

Навчально-методичний посібник для здобувачів ступеня вищої освіти магістра
спеціальності «Будівництво та цивільна інженерія»
освітньо-професійної програми «Промислове і цивільне будівництво»

Рецензент *В. Л. Вертегел*
Відповідальний за випуск *С. В. Іваненко*
Коректор *Л.В. Мосієвич*