Оглавление

ВВЕДЕНИЕ

Данное учебно-методическое пособие предназначено для обучающихся строительных специальностей, имеющих базовую языковую подготовку. Согласно рабочей программе по дисциплине «Иностранный язык» для неязыковых специальностей вузов цель данного учебно-методического пособия — комплексное развитие компетенций обучающихся, связанных с готовностью к использованию иностранного языка на уровне, обеспечивающем эффективную профессиональную деятельность и способностью анализировать научно-техническую информацию, изучать зарубежный опыт по тематике исследования в процессе самостоятельной работы.

Базу учебно-методического пособия образуют современные аутентичные профессионально-ориентированные тексты. Понимание текста предполагает обращение к контексту, многоаспектному понятию, включающему лингвокультурологические, научные, этнические аспекты обучения. Следовательно, обучение посредством учебного текста создает предпосылки к развитию личности студента, способствует пониманию ценностей иноязычной действительности и культуры.

Разделы учебно-методического пособия могут быть использованы для самостоятельной работы выборочно в зависимости от интересов обучающихся.

Задания к отдельным текстам пособия не следует рассматривать как единственно возможные варианты: творческая инициатива преподавателя, работающего с данным пособием, в каждом конкретном случае способна дать наиболее эффективные результаты обучения.

TEXT 1

1. Answer the following question and read the text below to check your answer.

What does the difference between an engineer and a scientist consist on?

“You see things; and you say "Why?" But I dream things that never were; and I say "Why not?"” George Bernard Shaw. What is an engineer? Engineers are problem solvers! Engineering is concerned with the implementation of a solution to a practical problem. A scientist may ask “why?” and proceed to research the answer to the question. By contrast, engineers want to know how to solve a problem and how to implement that solution. In other words, scientists investigate phenomena, whereas engineers create solutions to problems or improve upon existing solutions. A scientist builds in order to learn. An engineer learns in order to build”. One way to define engineering is: how to do new things in new ways. Engineering is the application of math and science to create something of value from our natural resources. Scientists discover the world that exists; engineers create the world that never was. Even the etymology of the word “engineer” reveals their problem-solving nature: “It is a myth that engineer originated to describe those who built engines”. In fact, the words engine and engineer (as well as ingenious) developed in parallel from the Latin root ingeniosus, meaning “skilled”.

What is Civil Engineering?

Civil Engineering is the oldest and quintessential engineering profession. It encompasses a variety of sub-disciplines and jobs. Architectural engineering is often a related but separate degree. Surveying is a skill used by many civil engineers, but there is a separate professional licensure for land surveyors. Urban planning is an activity that uses skills from a variety of the civil engineering sub disciplines. Some interesting thoughts on civil engineering by Bugliarello include: Civil engineering is the modification of nature to create and improve human habitats. Civil engineers work toward an ideal that is a standard of perfection, beauty, or moral and physical excellence, especially as an aim of attainment or realization. Civil engineers strive to match deep functionality with aesthetics in every manifestation of the profession. Engineers should be mindful that there is a moral compact between the engineer and world society. Professional engineers are responsible for observing societal needs, and often have the position and resources to improve society. As professionals, engineers are expected to set examples in the work field and to establish themselves as assets to society.

What is a profession?

A profession is defined by:

1. Knowledge = requires formal education, judgment and discretion that are not routine and cannot be mechanized; continuing education required.

2. Organization = sets standards for admission to profession, enforces standards of conduct, establishes codes of ethics.

3. Public good = purpose of service and preservation of public welfare. America’s engineers have always played a vitally important role in developing America’s way of life and standard of living. From constructing bridges and highways to exploring the vast earth beneath us, America’s engineers are helping to keep America moving and safe.

The American engineering profession needs to reassert its leadership; to raise its eyes and voices, roll up its sleeves, and do again for the nation what it did a century ago: make it a winner in the world marketplace. If competing and winning — rather than puttering and theorizing — become the real stuff of an engineering career, our best men and women, our winners, will once again gravitate toward the profession, and the impending decline of American engineering will become a thing of the past.

History provides the big picture, why large-scale projects were built and what their benefits are to society. You can wake people up to the importance of infrastructure, the efforts of the civil engineers who have improved the quality of life through its design and construction, why it needs to be repaired, and where tax dollars will be going. You can use history to educate. Engineers ... about where our present problems came from.

What do engineers need to know?

Based on the 1995 Civil Engineering Education Conference of the American Society of Civil Engineers (ASCE), the following areas were identified as fundamental elements which should be incorporated into Undergraduate engineering education:

1) a global vision and approach to problem identification and problem solving in areas such as infrastructure, environment, facilities, and systems;

2) a basic management knowledge base in areas such as business, resources, personnel management, communication skills, costs and value judgments, and time management;

3) a solid foundation in personal and inter-personal attributes ethics;

4) an involvement with engineering practice as the formal education evolves.

These elements were therefore chosen as emphasis areas for this course, and should provide a foundation for you as both professional engineers and in your future courses. What you learn here should help you identify areas where you will need to be strong in order to succeed as an engineer, and therefore in selecting courses which will allow you to build your skills in these areas.

2. Decide whether the following statements are true or false according to the text.

1. In opinion of George Bernard Shaw engineers create something that never existed before.
2. An engineer usually asks ‘Why?’ and a scientist wants to know how to solve a problem and finally comes up with a solution.
3. An engineer builds in order to learn. A scientist learns in order to build.
4. Scientists discover the world that exists; engineers create the world that never was.
5. Civil engineering is “the modification of manmade environment to create and improve human habitats.”
6. “America’s engineers have never played a vitally important role in developing America’s way of life and standard of living.

3. Answer the following questions and give examples.

1. Do engineers solve theoretical or hands-on problems?
2. What does the main difference between an engineer and a scientist consist on?
3. What does the occupation of a civil engineer encompass?
4. What do civil engineers work toward? What are their purposes?
5. What is it necessary to possess in order to change the world for better?
6. How do American engineers contribute to the prosperity of their country?
7. What are the main qualities a civil engineer should have?

TEXT 2

1. Answer the following question and read the text below to check your answer.
When and how did Civil Engineering become an independent profession?

Civil Engineering

Civil Engineering is the oldest and quintessential engineering profession. It encompasses a variety of sub-disciplines and jobs. Civil engineering is the oldest branch of engineering which is growing right from the stone age civilization. American Society of Civil Engineering defines Civil Engineering as the profession in which a knowledge of the mathematical and physical sciences gained by study, experience and practice is applied with judgment to develop ways to utilize economically the materials and forces of nature for the progressive well-being of man.

The Past

From the pyramids of Egypt to the exploration of space, civil engineers have always faced the challenges of the future — advancing civilization and building our quality of life. Engineering has developed from observations of the ways natural and constructed systems react and from the development of empirical equations that provide bases for design. It is the broadest of the engineering fields. In fact, engineering was once divided into only two fields; military and civil. Civil engineering is still an umbrella field comprised of many related specialties.

The Present

In modern usage, it is a broad field of engineering that deals with the planning, construction, and maintenance of fixed structures, or public works, as they are related to earth, water, or civilization and their processes. Most civil engineering today deals with power plants, bridges, roads, railways, structures, water supply, irrigation, environment, sewer, flood control and traffic.

The first self-proclaimed civil engineer was John Smeaton (1724–1792). In 1818 the Institution of Civil Engineers was founded in London and received a Royal Charter in 1828, formally recognizing civil engineering as a profession. The first degrees in Civil Engineering in the United States was awarded to William Clement, Jacob Eddy, Edward Suffern and Amos Westcott by Rensselaer Polytechnic Institute in 1835. The first such degree to be awarded to a woman was granted by Cornell University to Nora Stanton Blatch in 1905. In essence, civil engineering may be regarded as the profession that makes the world a more agreeable place in which to live. CE is about community service, development, and improvement.

The Future

Our future as a nation will be closely tied to space, energy, the environment, and our ability to interact with and compete in the global economy. As the technology revolution expands, as the world's population increases, and as environmental concerns mount, your skills will be needed. Whatever area you choose, design, construction, research, teaching, or management, civil engineering offers you a wide range of career choices. ASCE estimates that $3.6 trillion is needed by 2020 to bring the nation's infrastructure to a good condition. Establishing a long-term development and maintenance plan must become a national priority. But in the short term, small steps can be taken by the Congress, as well as state legislatures and local communities, to improve our nation's failing infrastructure.

Civil Engineering Graduate

As a Graduate student you will be prepared to perform at the entry level in civil engineering practice so that, some years after graduation, you can become licensed professionals having responsibility for the planning, design, implementation, operation and continuous improvement of civil engineering structures and infrastructure. You will be provided with skills and tools for life-long learning, continuing professional development, and to pursue advanced degrees. A bachelor's degree in civil engineering prepares you for a broad variety of careers in the field, including transportation engineering, environmental/water resources engineering, geotechnical engineering, land development and structural engineering.

2. Decide whether the following statements are true or false according to the text.

1. Civil Engineering is the youngest and non-significant engineering profession.
2. The origins of civil engineering date back to the stone age civilization.
3. Advancing civilization and building our quality of life are the main challenges that Civil Engineering faces.
4. The first degrees in Civil Engineering in the United States were awarded to William Clement, Jacob Eddy, Edward Suffern and Amos Westcott by Rensselaer Polytechnic Institute in 1835. Only 70 years after this the first such degree was awarded to a woman.
5. Whatever area you choose, design, construction, research, teaching, or management, civil engineering offers you a wide range of career choices.

3. Answer the following questions.

1. Is knowledge of mathematics and physics required by civil engineering? What about economics?
2. What has the engineering developed from?
3. What structures do most civil engineers deal with?
4. Who was the first to proclaim himself as a civil engineer?
5. If one wants to work in building industry, what building area is it to possible to choose?
6. When and how did Civil Engineering become an independent profession?

TEXT 3

1. Answer the following question and read the text below to check your answer.

What does the difference between a decorative and structural building material consist on?

Types of buildings and their structural components

Residential Buildings are used for normal residential purposes and should facilitate activities such as sleeping, living and cooking. The building must include one or more family residencies, apartments, flats and private garages.

Educational Buildings house educational institutions such as schools or colleges which are affiliated and recognized by an appropriate board, university or any similar affiliation authority. The building should promote the aggregation of instructional, educational and recreational activities pertaining to educational purposes. Further, it is mandatory for the building to have proper residential facilities for essential staff who need to reside within the campus.

Institutional Buildings consist of buildings that are constructed by the government, semi-government organizations or registered trusts for specific purposes. Those specific purposes include medical treatment purposes such as treatment of physical or mental illness, children's hospitals, old age homes, centers for the care of orphans or abandoned women, auditoriums or complexes meant to be used for cultural or allied activities, religious accommodation facilities such as jails, correctional facilities, detention centres, juvenile reformatories, etc.

Unsafe Buildings are buildings that structurally weak and thus unsafe, unsanitary or contaminated, do not have proper entry and/or exit facilities, prone to fire hazards, poses dangers to human life or according to its existing use, may pose a danger to safety, health or public welfare are deemed to be unsafe. As per government regulations, these buildings must undergo restoration, demolition or undertake necessary measures as per the instructions of the concerned authority.

Hazardous Buildings used for storage of such material or chemical which are highly dangerous to humans or it may pollute the environment.

They have majorly used storage, processing of highly combustible material handling, manufacture or explosive materials or products which are liable to burn with extreme rapidity and poisonous elements, manufacturing or processing of highly corrosive, toxic or noxious alkalies, acids or other liquids or chemicals producing flame, Poisonous, irritant or corrosive gases.

These buildings are also used for material processing which produces explosive mixtures of dust that result in the conversion of matter into fine particles subjected to spontaneous ignition.

2. Decide whether the following statements are true or false according to the text.

1. Residential Buildings are used for normal residential purposes and should facilitate activities such as sleeping, living and cooking.
2. Unsafe Buildings are buildings which decorations are made of low quality materials.
3. Educational Buildings house educational institutions such as theater cinema.
4. Hazardous Buildings are called hazardous because very angry dogs live there.
5. The fact that fine particles of inflammable material may be suspended in the air is highly dangerous.

3. Answer the following questions.

1. What are the purposes of erecting up residential buildings?
2. What is the difference between an industrial building and a residential building?
3. What do institutional buildings serve for?
4. How can Hazardous Buildings be characterized?
5. How to prevent spontaneous ignition from occurring inside a building?
6. What does the difference between a decorative and structural building material consist on?

What are the Structural Components of the Buildings?

Any object or a building in order to survive its designed life and serve the function for which it is designed has to bear its own loads and loads applied or loads coming over it. From that point of view a chair should have sufficient strong thick legs and firm support and so on. Thus, those components of any object which take the load and make survive the object are called the structural components of that object. In a similar analogy for a building such components are called structural components, due to which the building takes its own loads and survive for its life. In view of the above the walls, columns etc., are structural components of the building. With the advancement of the technology different geometrical configurations like framed structure, load bearing structure, shed structure etc., are popularly used to withstand the loads of different buildings. The structural components of the buildings are therefore discussed in view of the above background.

All buildings have similar components such as foundation, plinth, walls, floors, doors, windows and roof. Every component has its own function.

These building components are classified in two categories:

– non-structural Components;

– structural Components.

Non-structural components are parapet walls, door and windows, furnishings fixtures, partitions or partition walls, tiles, paint etc.

Structural components are the primary load bearing components of a building, and each have their own structural properties which need to be considered. Such components are: Foundation, Plinth, Wall and Pier in Superstructure, Column, Floor, Slab, Beam, Roof, Staircase, Lintel, Weather Shade.

4. Answer the following questions and give examples.

1. How is it necessary to design each structural element on a building in order it could last longer?
2. What loads are you familiar with?
3. What engineering solutions are made to help structural components bear loads all through their life cycle?
4. What common elements do all buildings have?
5. How can the building components be classified?

TEXT 4

1. Answer the following question and read the text below to check your answer.

What properties should modern building materials have?

Materials engineers are responsible for the selection, specification, and quality control of materials to be used in a job. These materials must meet certain classes of criteria or materials properties. These classes of criteria include:

– economic factors;

– mechanical properties;

– nonmechanical properties;

– production/construction considerations;

– aesthetic properties In addition to this traditional list of criteria, civil engineers must be concerned with environmental quality.

In 1997 the ASCE Code of Ethics was modified to include "sustainable development" as an ethics issue. Sustainable development basically recognizes the fact that our designs should be sensitive to the ability of future generations to meet their needs. There is a strong tie between the materials selected for design and sustainable development. When engineers select the material for a specific application, they must consider the various criteria and make compromises. Both the client and the purpose of the facility or structure dictate, to a certain extent, the emphasis that will be placed on the different criteria. Civil and construction engineers must be familiar with materials used in the construction of a wide range of structures.

Materials most frequently used include steel, aggregate, concrete, masonry, asphalt, and wood. Materials used to a lesser extent include aluminum, glass, plastics, and fiber-reinforced composites. Geotechnical engineers make a reasonable case for including soil as the most widely used engineering material, since it provides the basic support for all civil engineering structures. However, the properties of soils will not be discussed in this text because soil properties are generally the topic of a separate course in civil and construction engineering curriculums. Recent advances in the technology of civil engineering materials have resulted in the development of better quality, more economical, and safer materials.

These materials are commonly referred to as high-performance materials. Because more is known about the molecular structure of materials and because of the continuous research efforts by scientists and engineers, new materials such as polymers, adhesives, composites, geotextiles, coatings, cold-formed metals, and various synthetic products are competing with traditional civil engineering materials.

In addition, improvements have been made to existing materials by changing their molecular structures or including additives to improve quality, economy, and performance. For example, superplasticizers have made a breakthrough in the concrete industry, allowing the production of much stronger concrete. Joints made of elastomeric materials have improved the safety of high-rise structures in earthquake-active areas. Lightweight synthetic aggregates have decreased the weight of concrete structures, allowing small cross-sectional areas of components. Polymers have been mixed with asphalt, allowing pavements to last longer under the effect of vehicle loads and environmental conditions.

Many recent civil engineering projects have used fiber-reinforced polymer composites. These advanced composites compete with traditional materials due to their higher strength-to-weight ratio and their ability to overcome such shortcomings as corrosion. For example, fiber-reinforced concrete has much greater toughness than conventional Portland cement concrete. Composites can replace reinforcing steel in concrete structures.

In fact, composites have allowed the construction of structures that could not have been built in the past. The nature and behavior of civil engineering materials are as complicated as those of materials used in any other field of engineering. Due to the high quantity of materials used in civil engineering projects, the civil engineer frequently works with locally available materials that are not as highly refined as the materials used in other engineering fields. As a result, civil engineering materials frequently have highly variable properties and characteristics.

Vocabulary:

To be responsible for — нести ответственность за.

Sustainable development — устойчивое развитие.

An aggregate — заполнитель.

Concrete — бетон.

Lesser extent — в меньшей степени.

Fiber-reinforced composites — композиты, армированные волокнами.

High-performance material — материал с высокими эксплуатационными характеристиками.

Additive — добавка.

High-rise structure — высотное сооружение.

Plasticizer — пластификатор.

Due to — из-за.

2. Decide whether the following statements are true or false according to the text.

1. General contractors are responsible for the selection, specification, and quality control of materials to be used in a job.

2. Aesthetic properties don't play any role in the material selection.

3. When choosing a material for certain purpose many factors should be taken into account and compromises should be found.

4. Civil and construction engineers must be familiar with materials used in the construction of a very narrow range of structures.

5. Polymers are very brittle and their cross-sectional area must be huge.

6. The field of fiber composite materials has developed rapidly in the last 30 years.

7. Civil engineering materials frequently have highly variable properties and characteristics.

3. Answer the following questions and give examples.

1. Which criteria determine building materials properties?

2. Why aesthetic properties are as important as the other ones?

3. What groups the materials can be organized into?

4. What does geotechnical engineering include?

5. How improvements are applied to the materials?

6. Why did fiber-reinforced polymer composites become so familiar?

7. What can composites replace?

TEXT 5

1. Answer the following question and read the text below to check your answer.

How does the building material selection affect the construction economy and budget?

The economics of the material selection process are affected by much more than just the cost of the material. Factors that should be considered in the selection of the material include:

– availability and cost of raw materials;

– manufacturing costs;

– transportation;

– placing;

– maintenance.

The materials used for civil engineering structures have changed over time.

Early structures were constructed of stone and wood. These materials were in ready supply and could be cut and shaped with available tools. Later, cast iron was used, because mills were capable of crudely refining iron ore. As the industrial revolution took hold, quality steel could be produced in the quantities required for large structures. In addition, Portland cement, developed in the mid-1800s, provided civil engineers with a durable inexpensive material with broad applications. Due to the efficient transportation system in the United States, availability is not as much of an issue as it once was in the selection of a material. However, transportation can significantly add to the cost of the materials at the job site. For example, in many locations in the United States, quality aggregates for concrete and asphalt are in short supply. The closest aggregate source to Houston, Texas, is 150 km (90 miles) from the city. This haul distance approximately doubles the cost of the aggregates in the city, and hence puts concrete at a disadvantage compared with steel. The type of material selected for a job can greatly affect the ease of construction and the construction costs and time. For example, the structural members of a steel-frame building can be fabricated in a shop, transported to the job site, lifted into place with a crane, and bolted or welded together. In contrast, for a reinforced concrete building, the forms must be built; reinforcing steel placed; concrete mixed, placed, and allowed to cure; and the forms removed. Constructing the concrete frame building can be more complicated and time consuming than constructing steel structures. To overcome this shortcoming, precast concrete units commonly have been used, especially for bridge construction. All materials deteriorate over time and with use. This deterioration affects both the maintenance cost and the useful life of the structure. The rate of deterioration varies among materials. Thus, in analyzing the economic selection of a material, the life cycle cost should be evaluated in addition to the initial costs of the structure.

Vocabulary:

Availability — доступность.

Crudely — низкие.

Manufacturing costs — производственные затраты.

Maintenance — техническое обслуживание.

Quality aggregate — качественный заполнитель.

In short supply — в дефиците.

Haul distance — дальность транспортировки.

A steel-frame building — здания из стального каркаса.

Bolted — соединен болтами.

Deteriorate — ухудшаться.

2. Decide whether the following statements are true or false according to the text.

1. The economics of the material selection process are affected only by the cost of the material.
2. The materials used for civil engineering structures have evolved over time.
3. Transportation doesn’t add too much to the cost of the materials at the job site.
4. Constructing the concrete frame building can be less complicated and time consuming than constructing steel structures.
5. Precast concrete units are never used for bridge construction.

3. Answer the following questions and give examples.

1. What materials the early structures were made from?
2. What advantages did civil engineers take from using Portland cement?
3. Is the availability of a building problem for American construction industry?
4. How can selection of material affect the ease of construction?