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TECHNICAL ENGLISH FOR CIVIL ENGINEERING

BEGINNER'S LEVEL

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PREFACE

"English for Civil Engineering: Beginner's Level" has been meticulously crafted for second-year university students majoring in Civil Engineering who are learning English as a foreign language. This course is designed to bridge their English language skills with the technical content essential for their future careers. It focuses on the core everyday technical language used in civil engineering, providing a solid foundation for students to effectively communicate and comprehend technical content.

The primary goal of this course is to enable students to handle the written and spoken technical English integral to their civil engineering studies and future professional endeavours. By emphasizing vocabulary and communication skills through specialized topics, this course helps students navigate various aspects of civil engineering. It is not intended as a basic English course. Additionally, it does not aim to teach grammar, assuming students already possess a basic understanding of English grammar.

The course is organized into seven comprehensive lessons proceeded with needs assessment and identification, each addressing key areas critical to the field of civil engineering. Each section is structured to build students' confidence and ability in extracting information from technical manuals, textbooks, and professional contexts, thereby equipping learners with the linguistic skills and specialist vocabulary necessary for their work environment.

Each unit begins with a reading or listening comprehension section that includes a text or video to study interactively with students. This is followed by vocabulary exercises to ensure a deep understanding of the terminology. The units also include comprehension checks, contextual reference exercises, rephrasing activities, and practice and application exercises linking core vocabulary with related terms and phrases. Some units conclude with a guided writing section to integrate the learned vocabulary and concepts into a cohesive piece of writing.

Introduction

In the rapidly evolving field of civil engineering, effective communication is as critical as technical expertise. English, as the global lingua franca of science and technology, plays a vital role in enabling professionals to collaborate, innovate, and contribute to the international engineering community. *Technical English for Civil Engineering: Beginner's Level* is designed to address this need by providing a comprehensive and specialized resource for second-year university students pursuing civil engineering.

This manual is more than a traditional language-learning tool. It bridges linguistic proficiency and technical expertise, offering learners the opportunity to engage deeply with the vocabulary, concepts, and communication practices essential to their field. Each lesson is meticulously crafted to integrate reading, writing, listening, and speaking skills with technical applications. From mastering industry-specific terminology to interpreting technical texts and delivering effective presentations, the manual equips students with practical skills tailored to real-world engineering contexts.

The pedagogical approach combines foundational language instruction with a focus on application and critical thinking. Structured lessons incorporate interactive exercises, guided writing tasks, and vocabulary-building activities to ensure students can confidently navigate technical manuals, project documentation, and academic materials. Moreover, the manual emphasizes professional communication, preparing learners to collaborate in multidisciplinary teams and address the complexities of modern civil engineering projects.

As civil engineering plays an indispensable role in shaping infrastructure and addressing global challenges, this manual serves as a crucial resource for developing the linguistic and technical skills necessary for success. By integrating language learning with the demands of the profession, it lays the groundwork for academic achievement and positions students to excel in a highly competitive and interconnected world.

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Needs Assessment

Targeted Skills: Reading and Writing Listening and Speaking	**Duration**: 90 minutes
Aims: the first introductory session aims to assess students' level and identify their learning needs to tailor the course in order to address these gaps and enhance their academic and professional communication skills.	

Section 1: Survey

Tick the suitable column according to your competencies					
Skills	**Excellent**	**Good**	**Fair**	**Poor**	**Comments**
Reading					
Writing					
Listening					
Speaking					
Tick the suitable column according to your frequency of engagement					
Skills	**Daily**	**Weekly**	**Monthly**	**Rarely**	
Reading					
How often do you read technical documents or textbooks related to civil engineering?					
Writing					
How often do you write reports, project proposals, or technical documents?					
Listening					
How often do you listen to lectures, presentations, or discussions related to civil engineering?					
Speaking					
How often do you participate in discussions, presentations, or group work?					

Section 2: Diagnostic Test

Task 1: Watch the video and answer the following questions

Video Link: **What is Civil Engineering? (youtube.com)**

1. **What is the main idea presented in the video?**
2. **Watch the video again and determine whether the following statements are true or false**

1. Civil engineering is solely focused on architecture and does not involve collaboration with architects.
2. The speaker mentioned that architects focus on the creative aspect of design while civil engineers are responsible for implementing it.
3. Civil engineers have only one main role, which is designing.
4. The speaker highlighted that designers use software like AutoCAD to visualize structures and innovate.
5. Designers only work on large-scale projects like skyscrapers and never on smaller projects like waterslides.
6. The speaker explained that contractors are responsible for turning designers' plans into reality by managing resources and ensuring project completion within budget and safety regulations.
7. Client representatives have no role in ensuring the project stays on track and resolving issues on site.

3. Watch the video for the third time and fill in the gaps with the suitable words

1..... is not the same as architecture, but they work together.

2..... have three main roles: designer, contractor, and client representative.

3. Designers use calculations, standards, and design software to visualize……

4. Contractors turn the designer's plans into reality, managing materials, labour, and safety. Client representatives ensure projects stay on track and resolve issues on site.

5.....are responsible for efficient railway systems and highways.

Task 2: Read the text carefully and answer the following questions

Text

A construction project typically consists of five main phases: initiation, planning, execution, monitoring and control, and closure. Each phase is essential to ensure the project is completed successfully, on time, and within budget. First, the initiation phase involves defining the project at a broad level. This includes identifying the project goals, scope, purpose, and feasibility. During this phase, a project charter is created, and stakeholders are identified. Second, the planning phase is crucial for laying out the roadmap for the project. It involves developing detailed project plans that outline the tasks, timelines, resources, and budgets. Risk management and quality assurance plans are also formulated during this phase. Third, during the execution phase, the project plan is put into action. This phase involves coordinating people and resources, as well as integrating and performing the activities of the project in accordance with the project management plan. This is often the longest phase of the project. Fourth, the monitoring and control phase occurs simultaneously with the execution phase. It involves tracking the progress and performance of the project to ensure it stays on schedule and within budget. Key performance indicators (KPIs) are used to measure project performance and identify any areas that require corrective action. Finally, the closure phase marks the completion of the project. This phase involves finalizing all activities, completing any remaining deliverables, and formally closing the project. Lessons learned are documented, and a final project report is prepared to summarize the project's outcomes and performance.

A) Choose the suitable answer for each question

1. What is the primary objective of the initiation phase in a construction project?
   a) Developing detailed project plans
   b) Defining the project goals, scope, and feasibility
   c) Coordinating people and resources
   d) Finalizing all project activities

2. During which phase are risk management and quality assurance plans formulated?

   a) Initiation

   b) Planning

   c) Execution

   d) Closure

3. Which phase involves tracking the progress and performance of the project to ensure it stays on schedule?

   a) Initiation

   b) Planning

   c) Monitoring and Control

   d) Closure

B) Based on your reading, answer the following questions

1. What are the five phases of a construction project?
2. Describe the main goal of the planning phase.
3. Explain the significance of the monitoring and control phase in a construction project.

Part 3: Writing

Write a short paragraph defining Civil Engineering, highlighting its importance, and mentioning its branches.

Part 4: Speaking

The students sit for the speaking test individually, the teacher asks the students the following questions:

1. Would you introduce yourself, please?
2. Why did you choose Civil Engineering?
3. How do you find Civil Engineering? Easy discipline or hard?
4. What are the difficulties you face usually when you want to speak about your discipline in English?

N.B: Google Forms can be used to design the needs assessment and to facilitate data gathering.

Introduction to Civil Engineering Terminology

Targeted Skills: Reading and Writing	**Duration**: 90 minutes

Aims: By the end of the lesson, students will be able to recognize and use key civil engineering terms, common verbs, and nouns accurately in both written and spoken contexts**.**

Warm up: After displaying the picture, the students try to name the items demonstrated and discuss their usage

Source: [Set Of Various Construction Tools 13444436 Vector Art at Vecteezy]

Task 1: After presenting and explaining the meaning of words given in the table below, students write an example about each word.

Key Terms	**Meaning**	**Example**
Foundation	The base on which a structure rests	
Reinforcement	The process of strengthening concrete by using steel bars or mesh	
Aggregate	Material such as sand, gravel, or crushed stone used in concrete	
Load-Bearing	Able to support weight	
Compression	The act of pressing together	
Common Verbs		
Excavate	To dig out material from the ground.	
Pour	To cause (a liquid) to flow into a container or space	
Reinforce	To strengthen or support	
Erect	To construct or establish	
Survey	To measure and map out an area of land	

Common Nouns		
Blueprint	A detailed technical drawing	
Scaffold	A temporary structure used to support workers	
Beam	A long, sturdy piece of wood or metal used to support weight	
Masonry	Stonework or brickwork	
Surveyor	A person who measures land.	

Task 2: Fill in the blanks using the words from the box below

Foundation, reinforcement, aggregate, load-Bearing, compression, excavate, pour, reinforce, erect, survey, blueprint, scaffold, beam, masonry, surveyor

Civil engineering involves the design, construction, and maintenance of infrastructure projects. The base of any structure, known as the (1)......, must be strong and stable to support the entire building. Before construction begins, engineers often (2) ….....the land to ensure it is suitable for building.

One of the first steps in construction is to (3).....the site, removing soil and rocks to prepare for the foundation. Once the site is ready, workers will (4)…… the concrete into molds to create the foundation. Concrete, which is strong in (5)……but weak in tension, often needs (6) .....with steel bars to enhance its strength. The structural integrity of a building also relies on (7).....walls, which support the weight of the structure. Materials like sand, gravel, and crushed stone, collectively known as (8)…….are mixed with cement to form concrete.

Detailed technical drawings, known as (9)……., guide the construction process. To ensure safety and accessibility, workers use a (10) .....when working at heights. Structural components such as steel or wooden (11) .....are essential for supporting floors and roofs. The craftsmanship involved in stonework or brickwork is referred to as (12) …….. A (13).....ensures that all land measurements and boundaries are accurate. During construction, it is crucial to (14) ….....key elements like beams and columns to add strength. Workers also need to (15)..... temporary structures, such as scaffolding, to assist in the construction process. Each phase of the project must be monitored to adhere to the (16) ….....and project specifications.

Introduction to Civil Engineering

Targeted Skills: Reading and Writing	**Duration**: 90 minutes

Aims: this lesson aims to:

- To develop students' understanding of civil engineering and its importance to modern society.
- To enhance students' ability to comprehend and analyse a technical text.
- To develop writing skills by composing a concise definition paragraph.

Warm-up: before reading the text and answer the followed questions, the students think about civil engineering scope and definition and answers are elicited using these warm-up questions.

1. What is Civil Engineering?
2. Who is a Civil Engineer?
3. Why Civil Engineering is important?

Text

Civil Engineering is a branch of engineering that focuses on the social, commercial, and industrial infrastructure essential for modern society. Civil engineers are responsible for constructing and maintaining roads, bridges, tunnels, public buildings, sewer systems, and more. **Their** work involves the planning, building, and upkeep of a wide variety of structures Creativity plays a crucial role in their profession. Engineering is often defined as the practical application of theoretical sciences like physics and chemistry. However, many early branches of engineering relied more on empirical knowledge gathered from observation and experience rather than theoretical understanding. Ancient structures such as the bridges, arenas, and aqueducts of Rome have survived because **they** were constructed with greater strength than modern standards typically require.

Historically, military engineers were tasked with designing and building roads, fortifications, and bridges, as well as demolishing enemy structures using tunnels and explosives. By the 18th century, engineering had evolved into a civilian profession, leading to the emergence of civil engineering. The first civil engineering school, École Nationale des Ponts et Chaussées, was established in Paris in 1747. John Smeaton, **who** developed new waterproof pozzolanic cements to construct a lighthouse in the English Channel in the late 18th century, is often regarded as the first self-proclaimed civil engineer. The Institution of Civil Engineers, founded in London in 1828, was the world's first engineering society.

Civil engineering presents unique challenges because almost every project undertaken by civil engineers is distinct. Replicating a structure exactly is rare, requiring civil engineers to continuously adapt and innovate. Recent technological advances offer numerous opportunities for innovation in design and construction. The rapid growth in computer technology has enabled numerical modeling and analysis, as well as virtual reality techniques, to aid in the design and construction processes. Composite materials are increasingly used to create larger and stronger structures, accommodate seismic and dynamic forces, enhance fire resistance, and meet environmental standards.

Undergraduate education for civil engineers covers a wide range of subjects, including mathematics, physics, mechanics, hydraulics, materials science, structural design and analysis, geology and geotechnics, surveying, construction technology, planning and financial management, computer technology, and health and safety.

Text Comprehension

1. Read the passage above carefully and answer the following questions.

1. What are the primary responsibilities of civil engineers according to the passage?
2. How is engineering defined?
3. How did early branches of engineering differ from the modern definition of engineering?
4. Why are ancient Roman structures still standing today?
5. Why did civil engineering develop from military engineering?
6. What significant change occurred in the engineering profession in the 18th century?
7. Who is considered the first self-proclaimed civil engineer and what was his notable achievement?

2. As you read the text, determine the main idea of each paragraph.

The main idea of paragraph one (1) is:

1. The importance of creativity in civil engineering.
2. Civil engineering's role in infrastructure for modern society.
3. The types of structures civil engineers build.

The main idea of paragraph one (2) is:

1. The practical application of theoretical sciences in engineering.
2. Early engineering relied on empirical knowledge.
3. Ancient Roman structures were built to last.

The main idea of paragraph one (3) is:

1. The history of military engineers.
2. The evolution of engineering into a civilian profession.
3. The founding of the first civil engineering school.

The main idea of paragraph one (4) is:

1. The first engineering society.
2. John Smeaton’s contribution to civil engineering.
3. Significant figures and organizations in civil engineering history.

Text Exploration

1. Match the following definitions with the suitable words from the passage.

1..... The art or practice of designing and constructing buildings.

2..... A building or other structure designed for people to live in or work in.

3..... A material that binds together to create a solid structure.

4..... The use of explosives to destroy something, typically a building.

5..... A bridge built to carry water, usually a stone structure from ancient times.

2. Identify what the following pronouns refer to in the passage.

Their (1p) =…… They (1p)=…… Who(2p) =……

3. Fill in each gap with the appropriate word from the given box.

constructing, planning, empirical, theoretical, innovation, technology, structures, education.

Civil Engineering involves the **(1)……**, building, and maintenance of various **(2)……..** essential for modern society. Historically, engineering relied on **(3)……..** knowledge rather than **(4)……**understanding. Today, rapid advancements in **(5)……** offer numerous opportunities for **(6)……** in design and construction. Undergraduate **(7)…….**for civil engineers includes subjects like mathematics, physics, and computer **(8)…….**

4. Rewrite the following sentences in passive voice

1. Civil engineers design new infrastructure.
2. John Smeaton developed new waterproof cements.
3. Engineers are using virtual reality techniques.
4. They maintain public buildings and sewer systems.
5. Technological advances have enabled numerical modeling.

Written Expression

Based on your prior knowledge of Civil Engineering, write a short paragraph defining Civil Engineering, highlighting its importance, key responsibilities of a civil engineer, and the skills required.

Branches of Civil Engineering

Targeted Skills: Reading and Writing	**Duration**: 90 minutes

Aims: this lesson aims to:

- To understand the different subfields within civil engineering.
- To develop vocabulary and comprehension skills.
- To practice identifying main ideas and referencing pronouns.
- To reinforce grammar knowledge and writing skills specific to civil engineering

Warm- up: before reading the text and answering the followed questions, students observe the following pictures and try to guess the branches of Civil Engineering and try to define each branch.

Text:

Civil engineering encompasses several specialized subfields, each addressing different aspects of infrastructure development and environmental management. First, Structural Engineering is a branch of Civil Engineering that focuses on designing and analysing permanent structures such as buildings, bridges, and tunnels. Structural engineers ensure **these** constructions are safe, stable, and capable of withstanding various forces, including gravity, wind, and seismic activity. Second, Hydraulic engineering deals with systems involving the flow and control of water and other fluids. This includes designing dams, canals, levees, stormwater management systems, and flood control infrastructure. Hydraulic engineers manage water resources effectively and mitigate risks associated with water-related hazards. Third, Sanitary or Environmental Engineering is a subfield of Civil Engineering that involves studying and managing water supply, purification, and sewer systems. Environmental engineers ensure clean and safe water for communities, treat wastewater, and address pollution control and environmental sustainability issues.

Geotechnical Engineering is another sub-area that attract engineers that is concerned with the study of soil and rock behaviour to support the design and construction of foundations, retaining walls, tunnels, and other structures. **They** assess ground conditions to ensure that structures are built on stable and secure foundations. Moreover, Transportation Engineering is another branch that focuses on designing, constructing, and maintaining transportation systems, including roads, highways, railways, airports, and mass transit systems. Transportation engineers aim to create efficient, safe, and sustainable transportation networks that meet society's needs. Furthermore, Construction engineers manage construction projects, ensuring they are completed on time, within budget, and according to specifications. They oversee the planning, execution, and monitoring of construction activities, coordinating with various stakeholders to deliver successful projects. Finally, Materials Engineering is a subfield that involves studying and applying materials used in construction. Materials engineers develop new materials and improve existing ones to enhance the durability, strength, and sustainability of structures.

Many of these specialties intersect. For instance, a water supply system might include dams and other structures designed by structural engineers and the management of water flow and storage overseen by hydraulic engineers. Similarly, a transportation project might involve geotechnical considerations for stable foundations and structural design for bridges and tunnels. Consequently, civil engineers must commit to continuous education and adapt to the evolving

demands of their profession. Furthermore, engineers must meet two critical requirements in all projects. First, **their** systems must be viable not only technically but also economically. This necessitates collaboration with management and government officials who are mindful of costs, requiring engineers to align **their** ideas with the financial constraints of a project. Engineers must design solutions that are effective and cost-efficient, ensuring projects can be funded and maintained over time. Second, engineers must account for the increasing public awareness of the social and environmental impacts of their work. In today's world, engineering solutions must be functional, sustainable, and socially responsible. Engineers must consider the environmental footprint of their projects, strive to minimize negative impacts, and enhance the quality of life for the communities they serve. This involves incorporating green technologies, using sustainable materials, and ensuring projects do not harm local ecosystems or populations.

In summary, civil engineering is a diverse and dynamic field that encompasses various sub-disciplines, each contributing to the development and maintenance of our built environment. Civil engineers must continuously learn and adapt, balancing technical, economic, and social considerations to create solutions that are safe, efficient, and sustainable.

Text Comprehension

1. Read the passage above carefully and answer the following questions.

1. What are the main responsibilities of structural engineers?
2. How do hydraulic engineers contribute to managing water-related hazards?
3. What are the key focuses of sanitary or environmental engineering?
4. Why is continuous education important for civil engineers?
5. How do engineers ensure their projects are economically viable?
6. What is the significance of considering social and environmental impacts in engineering projects?

2. As you read the text, determine the paragraph in which idea is mentioned. If an idea is not mentioned, write NM.

1. Structural engineers design dams and canals.
2. Structural engineers focus on permanent structures' safety and stability.
3. Structural engineers are responsible for environmental sustainability.
4. Hydraulic engineers manage water flow and control systems.
5. Hydraulic engineers design buildings and bridges.
6. Hydraulic engineers ensure clean water for communities.
7. Sanitary engineers focus on soil behaviour.
8. Sanitary engineers study transportation systems.
9. Sanitary engineers manage water supply and pollution control.
10. Geotechnical engineers assess ground conditions for construction.
11. Geotechnical engineers design mass transit systems.

12. Geotechnical engineers manage construction projects.
13. Transportation engineers focus on sustainable networks.
14. Transportation engineers design water purification systems.
15. Transportation engineers develop new construction materials.
16. Construction engineers manage and oversee project execution.
17. Construction engineers study rock behaviour.
18. Construction engineers design transportation networks.
19. Materials engineers improve existing materials for construction.
20. Materials engineers design foundations.
21. Materials engineers manage water resources.

Text Exploration

1. Match the definitions with the correct terms from the passage.

1. ……:The branch of civil engineering dealing with the design and analysis of permanent structures.
2. ..... Engineers who manage water resources and design systems to control the flow of water.
3. ……:The study and management of water supply, purification, and sewer systems.
4. ..... The engineering subfield that assesses soil and rock behaviour for construction projects.
5. ……:Engineers responsible for creating and maintaining transportation systems.
6. .....Engineers who oversee the planning and execution of construction projects.
7. .....The study and application of construction materials to enhance structure durability and strength.

2. Identify what the following pronouns refer to in the passage.

These (1p)=…… They (2p) =……..

Their (3p)=……. Their (3p) =…….

3. Fill in each gap with the appropriate word from the given box.

Water, safe, subfields, water, environmental

Civil engineering includes various ……..such as structural, hydraulic, and environmental engineering. Structural engineers ensure buildings and bridges are …… and stable. Hydraulic engineers manage the flow and control of ……., designing dams and flood control systems. Environmental engineers

focus on ……supply and wastewater treatment to promote …..... sustainability.

Written Expression

Based on your prior knowledge and the vocabulary learned in this lesson, write a short paragraph defining civil engineering, mentioning its subfields and their roles in infrastructure development.

Civil Engineering Basics

Targeted Skills: Listening and Speaking	**Duration**: 90 minutes

Aims: this lesson aims to:

- To enhance listening comprehension and speaking skills related to the basics of civil engineering.
- To familiarize students with key concepts and vocabulary in civil engineering.
- To promote active listening and critical thinking

Warm up: before listening and watching the video, the students think and try to answer the following discussion questions:

1. What do you think are the main responsibilities of civil engineers?
2. How would you define civil engineering in your own words?
3. Which sub-discipline of civil engineering interests you the most and why?
4. How do civil engineers contribute to improving the quality of life for people?
5. What do you think are the key challenges that civil engineers face in their profession?

Task 1: with their suitable definitions

1. Design 2. Construct 3. Analyse 4. Foundation 5. Survey 6. Maintain 7. Plan 8. Evaluate 9. Inspect 10. Infrastructure	a. The base or groundwork of a structure, providing stability. b. To create detailed plans and drawings for something to be built. c. To build or assemble a structure or system. d. To examine something carefully to understand its components or to find faults. e. The basic physical and organizational structures needed for the operation of a society, such as transportation and communication systems, water and power lines. f. To assess the condition or performance of something, typically by collecting and analysing data. g. To devise a detailed proposal for doing or achieving something in the future. h. To keep in good condition by regularly checking and repairing as needed. i. To measure and record the features of a piece of land to create maps or plans. j. To determine the value, significance, or condition of something by careful appraisal and study.

Task 2: Watch the video and identify the main ideas presented and discussed in the video

Video Link: **Civil Engineering Basic Knowledge You Must Learn (youtube.com)**

Task 3: Watch the video and determine whether the following statements are true or false

Video Link: **Civil Engineering Basic Knowledge You Must Learn (youtube.com)**

1. Civil engineering is a new and limited branch of engineering……
2. Civil engineers aim to enhance people's quality of life by offering secure and sustainable infrastructure solutions……

3. Structural Engineers do not consider factors like wind, earthquakes, or the weight of occupants when designing structures……..
4. Geotechnical Engineers analyse soil and rock mechanics to assess their impact on infrastructure projects like slope stability and foundation strength…….
5. Environmental Engineers do not focus on protecting the environment or public health……
6. Water Resources Engineers are vital in providing communities with clean and safe water and ensuring efficient water usage…….
7. Construction engineers and managers do not care about project completion time, budget, or quality standards……

Task 4: Watch the video and listen attentively to answer the following questions

Video Link: **Civil Engineering Basic Knowledge You Must Learn (youtube.com)**

1. What is civil engineering and what does it primarily deal with?
2. Why is having a strong foundation in mathematics and physics essential for a successful civil engineer?
3. What are some key disciplines within civil engineering that every engineer should be familiar with?
4. How do structural engineers ensure the safety and stability of structures like buildings and bridges?
5. What is the role of geotechnical engineers in infrastructure projects?
6. What factors do transportation engineers consider when designing efficient Transportation Systems?
7. What steps are involved in the design process of civil engineering projects?

Task 5: Watch the video again and fill in the gaps with the suitable words.

Video Link: **Civil Engineering Basic Knowledge You Must Learn (youtube.com)**

1. Civil engineering is a diverse branch that deals with infrastructure projects like ……
2. Mathematics and physics are essential for understanding……..
3. Key disciplines in civil engineering include……..
4. Structural engineers ensure the……..
5. Geotechnical engineers study…….
6. Transportation engineers plan…….
7. Environmental engineers focus on protecting…….
8. Water resources engineers manage…….
9. Construction engineers and managers ensure projects are completed……
10. The design process in civil engineering involves……..

Task 6: the teacher opens the discussions about the video using the following questions. Students share their ideas about the asked questions

1. What inspired you to study civil engineering?
2. What do you think are the most important qualities of a successful civil engineer?
3. How do the different subfields of civil engineering intersect and collaborate?
4. How do their own career interests might align with these subfields?
5. How do you see the role of civil engineers evolving in the next decade?
6. What are some of the biggest challenges facing civil engineers today?
7. What is the importance of sustainability in civil engineering projects?

8. What ethical considerations must civil engineers keep in mind when working on a project?
9. What steps can civil engineers take to minimize the environmental footprint of their projects?

Useful Expressions for Civil Engineering Discussions

General Discussion Starters	Asking for Clarification
1. In my opinion, civil engineering is essential because... 2. One of the key responsibilities of a civil engineer is to... 3. From a technical perspective, it's important to...	1. Could you explain what you mean by...? 2. I'm not quite sure I understand. Can you elaborate on...? 3. Can you give an example of...?
Expressing Agreement	**Expressing Disagreement**
1. I completely agree with your point about... 2. That's a valid point, especially considering... 3. I think you're right when you say that...	1. I see your point, but I believe that... 2. I'm not sure I agree with you on... 3. That's an interesting perspective, but I think...
Giving Examples	**Adding Information**
1. For instance, in the case of... 2. A good example of this would be... 3. One notable project that demonstrates this is...	1. Furthermore, it's important to consider... 2. Additionally, we should take into account... 3. Another aspect to look at is...
Asking for Opinions	**Summarizing Points**
1. What do you think about...? 2. How do you feel about...? 3. What's your take on...?	1. In summary, the main points are... 2. To sum up, we can say that... 3. Overall, it appears that...
Discussing Challenges and Solutions	**Making Suggestions**
1. One major challenge in this field is... 2. A potential solution to this issue could be... 3. To address this problem, engineers could...	1. It might be beneficial to consider... 2. Perhaps we should look into... 3. I suggest we explore...

Task 7: Write a brief reflection on the insights you got from the video and the discussion. Present your reflection and summary to your mates and your teacher for feedback

Principal Construction Materials

Targeted Skills: Reading and Writing	**Duration**: 90 minutes

Aims: this lesson aims to:

- Enable students to recognize and name common construction materials through visual aids and videos.
- Improve students' ability to understand and interpret a technical text about construction materials and their historical and modern uses.
- Provide a comprehensive understanding of different construction materials, including their properties, uses, and historical significance
- Encourage students to summarize technical texts, reinforcing their understanding and ability to convey information succinctly.

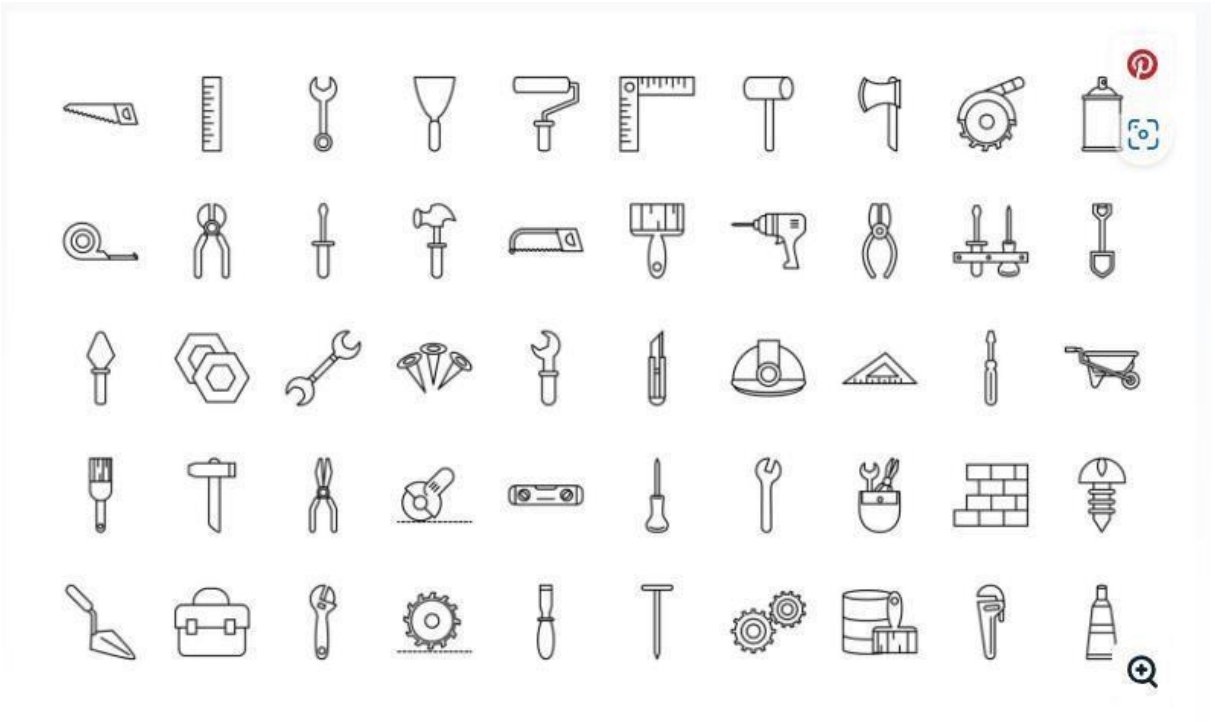
Warm-up: students look at the picture representing construction materials and they try to guess their names

Source: [520,700+ Building Materials Stock Illustrations, Royalty-Free Vector Graphics & Clip Art - iStock | Construction, Construction site, Lumber (istockphoto.com)]

Task 1: Watch the following videos about construction materials. Then, name the construction materials below without looking to the videos.

Video Link: [(83) English Vocabulary - CONSTRUCTION - YouTube]

Video Link: [(83) Construction Vocabulary ll 120 Construction Items Name in English With Pictures ll Masonry Tools - YouTube]



Source: [Tool repair and construction icon collection 1254873 Vector Art at Vecteezy]

Text

In earlier times, the primary construction materials were wood and masonry, **which** included brick, stone, clay, and tile. Tiles are flat, square pieces of baked clay or other materials used to cover floors or baths. When formed into thin curved pieces**, they** are used for roofing. Bricks or stones were bonded together with mortar, a mixture of cement or lime, sand, and water.

The Greeks and Romans occasionally reinforced their buildings with iron rods. For instance, the columns of the Parthenon in Athens have holes that once held iron bars, which have since rusted away. The Romans also developed a superior waterproof cement known as pozzolana, made by mixing water, lime, and sand with a fine powder from volcanic rock found near Pozzuoli. Cement is a binding material that reacts with water to become cementitious, known as hydrated cement in this state. Unlike traditional lime mortar, cement hardens without needing air contact, making it a hydraulic binder.

Concrete, often described as an "artificial stone," is composed of cement, water, and aggregates like sand or gravel. **It** is poured into molds or formwork and compacted by agitation and pressing. Fresh concrete sets and hardens. The most common type of concrete used today is Portland cement concrete, invented in 1824 by bricklayer Joseph Aspdin. Portland cement is a mixture of limestone and clay, heated and ground into a powder. At or near the construction site, it is mixed with sand, aggregate (small stones, crushed rock, or gravel), and water to create

concrete. The proportions of these ingredients can be adjusted to produce concrete with varying strength and weight.

Concrete is highly versatile, capable of being poured, pumped, or sprayed into various shapes. While steel possesses high tensile strength, concrete excels in compression strength, making them complementary materials**. They** also expand and contract at nearly the same rate, allowing them to work together in situations involving both compression and tension. Steel rods are embedded in concrete to create reinforced concrete, used in structures where tension occurs. Reinforced concrete is a versatile material widely employed in load-bearing structures of buildings. Additionally, steel does not rust within concrete because concrete's alkaline nature prevents corrosion, unlike acidic environments that corrode steel.

Steel, a strong and durable alloy of iron and carbon, has numerous applications in construction due to its toughness and strength. The best building materials are strong, durable, and readily available, and steel meets all these criteria, making it the most commonly used alloy in the industry.

Text Comprehension

1. **Read the passage above carefully and answer the following questions.**
1. What were the major construction materials in earlier times?
2. How did the Greeks and Romans reinforce their buildings?
3. What is pozzolana, and why was it significant?
4. What is Portland cement, and who invented it?
5. Why are steel and concrete considered complementary materials in construction?

2. **Determine the main idea of each paragraph**

The main idea of paragraph one (1) is:

a) The uses of tiles in construction.
b) Traditional construction materials and their uses.
c) The composition and function of mortar.

The main idea of paragraph one (2) is:

a) The reinforcement techniques used by Greeks and Romans.
b) The development and significance of pozzolana cement.
c) The properties and uses of cement.

The main idea of paragraph one (3) is:

a) The invention and composition of Portland cement concrete.
b) The process and versatility of using concrete in construction.
c) The role of Joseph Aspdin in developing concrete.

The main idea of paragraph one (4) is:

a) The complementary properties of steel and concrete.
b) The use of reinforced concrete in construction.
c) The benefits of concrete's alkaline nature.

The main idea of paragraph one (5) is:

a) The various applications of steel in construction.
b) The advantages of steel as a building material.

c) Why steel is the most commonly used alloy in the construction industry.

Text Exploration

1. **Match the definitions with the correct terms from the passage.**

A flat square piece of baked clay used for covering floors or baths.

a) Brick
b) Tile
c) Stone

A mixture used to bond bricks or stones, consisting of cement or lime, sand, and water.

a) Mortar
b) Concrete
c) Pozzolana

A type of cement developed by the Romans, known for its waterproof qualities.

a) Portland cement
b) Pozzolana
c) Hydraulic binder

A process where fresh concrete is poured into molds and compacted.

a) Aggregation
b) Formwork
c) Shuttering

A combination of materials that include cement, water, and aggregates like sand or gravel, often referred to as an "artificial stone."

a) Mortar
b) Reinforced concrete
c) Concrete

2. **Identify what the following pronouns refer to in the passage.**
   Which(1p)=…… They (1p) =……..
   It (3p)=……. They (4p) =…….
3. **Fill in each gap with the appropriate word from the given box.**

Portland, concrete, mortar, reinforced, pozzolana

1. Bricks or stones were bonded together with a mixture called…….
2. The Romans developed a waterproof cement known as……..
3. ..... is described as an "artificial stone" composed of cement, water, and aggregates.
4. Steel embedded in concrete to create ..... concrete enhances its tensile strength.
5. ..... cement is a mixture of limestone and clay, heated and ground into a powder.

Written Expression: Write a short summary of the text

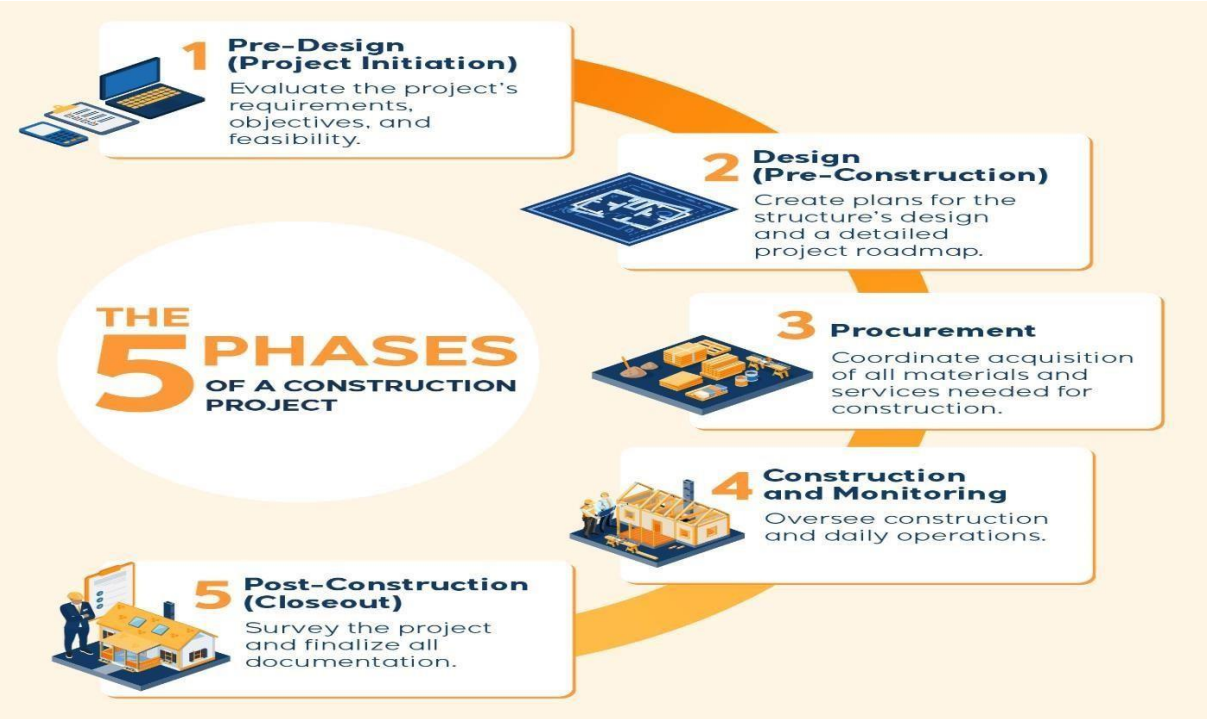
Construction Process

Targeted Skills: Listening and Speaking	**Duration**: 90 minutes

Aims: this lesson seeks to:

- Enhance students' listening comprehension skills, specifically related to construction processes.
- Improve students' ability to summarize and communicate complex procedures effectively.
- Develop students' vocabulary and terminology related to construction.
- Foster critical thinking and evaluative skills through true/false and detailed question exercises.

Warm up: students look at the pictures representing construction process and they try to describe its steps



Source: [The 5 Phases of a Construction Project | BigRentz]

Task 2: Watch the video and identify the main idea and the construction steps presented in the video

Video Link: [(83) 12 Steps of Construction - YouTube]

Task 3: Watch the video and determine whether the following statements are true or false

Video Link: [(83) 12 Steps of Construction - YouTube]

1. The speaker mentioned that the construction drawings are approved before the project is awarded to a contractor.
2. The first step in construction is clearing the ground.
3. The construction Personnel task is to create obstructions and debris on the construction site.
4. Temporary facilities like Engineer's Office and material storage room should be set up before work begins.
5. A sight perimeter fence should not be constructed during this period.
6. Setting reference points and construction grid lines is part of site layout and staking.
7. Excavation works begin before the layouts of construction points and grid lines are completed.

Task 4: Watch the video and listen attentively to answer the following questions

Video Link: [(83) 12 Steps of Construction - YouTube]

1. What is the recommended minimum excavation depth for the footing to rest?
2. Why is proper caution necessary during the excavation stage?
3. When should compacting of the excavated surface be performed?
4. What percentage of maximum dry density should the final compacted layer reach?
5. Why is an anti-termite treatment on the ground considered at a certain stage?

6. What is the composition of PCC used for the footing rebar?
7. How many coats of pitchman paint should be applied for both footing and stub columns?

Task 5: Watch the video again and fill in the gaps with the suitable words.

Video Link: (83) 12 Steps of Construction - YouTube

1. Construction begins after approval of……..
2. Clearing the ground is the first step to start……..
3. Temporary facilities like offices, labor quarters, and storage rooms are……..
4. Site layout involves setting……
5. Excavation begins after layout completion, with caution for……..
6. Compacting and laying of……..
7. Foundation rebar and column starter bars are……..
8. Concreting of foundations and column rebar installation is…….
9. Column concreting and application of……..
10. Perimeter blocks are set up to establish project……

Summarising Techniques

Summarising a listening passage is different from summarising written passage. It involves capturing the main ideas and essential details while omitting unnecessary information us. Here are techniques and tips to summarize a listening passage effectively:

1. Listen attentively, stay focused and avoid distractions
2. Take notes of key points, important details and repeated words and information
3. Identify the main ideas by paying attention signposts indicated usually by such expressions "The main point is…" or "In summary…"
4. Use abbreviations and symbols while taking notes to save time (e.g., “b/c” for because, “&” for and).
5. Organise your notes logically in bullet points, numbers or mind maps.
6. Write the summary using your own words while keeping the original meaning intact.
7. Keep your summary concise and include only the most critical points and ideas.
8. Ensure the summary answers the following questions: who, what, when, where, why, how?
9. Start with the main idea, followed by the most important supporting details.

Task 6: in five (5) minutes, prepare an oral summary of the previous video using your notes taken while listening.

Delivering a Successful Academic Presentation

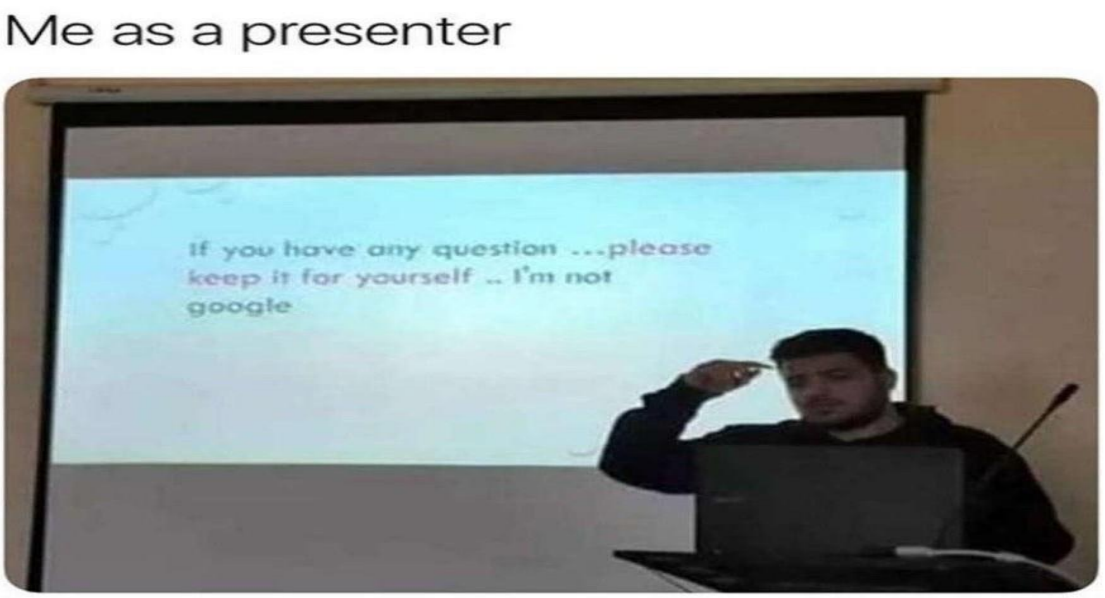
Targeted Skills: Listening and Speaking	**Duration**: 180 minutes

Aims: This lesson aims to equip civil engineering students with the essential skills to deliver successful academic presentations. By the end of this lesson, students will be able to effectively structure and present their ideas, engage their audience, and overcome common obstacles in public speaking. They will also practice applying these skills to topics relevant to their discipline, thereby enhancing their professional communication capabilities.

Warm up: The teacher asks the students some questions regarding academic presentation

1. According to you, what makes a good presentation?
2. What is the first aspect that captivates your attention in a presentation?
3. What are the obstacles and the difficulties you face usually while preparing and delivering a presentation?
4. How do you deal with these obstacles and challenges?

Task 1: The teacher displays some memes about awkward presentation moments and the students share their experiences related to each meme



Delivering a Successful Academic Presentation

For civil engineering students, mastering academic presentation skills is crucial for clearly conveying technical concepts and project proposals. It enhances their ability to collaborate with multidisciplinary teams and effectively communicate with stakeholders. Proficiency in this area also boosts their career prospects by showcasing their expertise and professionalism. The following parts provide insights about how to structure and deliver a successful academic presentation.

Tips for a Good Presentation

1. **Analyse Your Audience**: Understand who your audience is, their level of knowledge on the topic, and their interests. This helps tailor your presentation to their needs and keeps them engaged.
2. **Use Visuals, Body Language, Tone, and Intonation**:
   - **Visuals:** Use slides, images, graphs, and videos to support your points and keep the audience's attention.
   - **Body Language:** Use gestures, eye contact, and movement to emphasize points and connect with your audience.
   - **Tone and Intonation:** Vary your voice to maintain interest, highlight key points, and convey enthusiasm.
3. **Be Relatable**: Share personal anecdotes or relatable stories to make your points more engaging and memorable.
4. **Use Structure to Build Your Ideas**: Have a clear outline with a logical flow. Start with an introduction, followed by the main content, and conclude effectively.

5. **Practice and Rehearse**: Rehearse your presentation multiple times to build confidence and smooth out any rough spots. This also helps you manage your time effectively.
6. **Use Strategies**:
   - **Repetition**: Reinforce key points by repeating them.
   - **Rhetorical Questions**: Engage the audience by posing questions.
   - **Telling Stories**: Use stories to illustrate your points and make them more relatable and engaging.

Tips for a Well-Structured Presentation

1. **Start**:
   - **Greet the Audience**: Establish a connection right from the beginning.
   - **State the Objective**: Clearly explain what you aim to achieve with your presentation.
   - **Introduce the Topic**: Provide context and background information.
   - **Give the Overall Structure**: Outline what will be covered.
   - **Explain the Rule of Questions**: Let the audience know when and how they can ask questions.
   - **State the Duration**: Inform the audience about the length of the presentation.

Strategies for a Good Start:

- **Rule of Three**: Present information in groups of three for better retention.
- **Rhetorical Questions**: Engage the audience and provoke thought.
- **Visuals**: Use images or videos to grab attention.
- **Interesting Fact**: Share a surprising fact to pique interest.
- **Quote**: Use a relevant quote to set the tone.
- **Shocking Statistics**: Present eye-opening data to highlight the importance of your topic.
- **Anecdotes, Simile, Metaphor**: Use figurative language to create vivid imagery and connections.

Expressions for a Good Start:

- Greetings like "Good morning" or "Hello."
- State your purpose, e.g., "My purpose today is to…"
- Outline your points, e.g., "I am going to develop three main points…"

2. **Content Strategies and Tips:**

- **Follow the Outline**: Stick to your planned structure.
- **Indicate Signposting by Use of Transitions**: Use clear transitions to guide the audience through your presentation.

- **Follow the Rule of Three**: Present information in triads.
- **Use Repetition**: Reinforce key points by repeating them.
- **Repeat Mantra or Slogan**: Use memorable phrases to emphasize your message.
- **Use Examples and Illustration**: Provide concrete examples to clarify abstract points.
- **Use Comparison and Contrast**: Highlight differences and similarities to make your points clearer.

3. Finish

1. **Signal the Finish**: Clearly indicate that you are concluding.
2. **Summarize the Main Points**: Recap the key takeaways.
3. **Finish with a Bang**: End with a strong statement, question, or call to action to leave a lasting impression.

Expressions for a Good Finish

- Concluding phrases like "To conclude…," "This brings me to the end of my presentation…," and "Let's recap the main points…"
- Thank the audience, e.g., "I hope you found it interesting, and thank you for listening."

Task 3: Choose a topic related to your discipline and try to develop it into an academic presentation respecting the points and tips discussed previously. Present your work in front of your mates. Use the following evaluation grid to help your prepare and deliver an effective presentation.

Criteria	**Excellent**	**Good**	**Average**	**Poor**	**Remarks**
Start					
1. Greeting and connecting with the audience					
2. Why?					
3. What?					
4. How? (outline, rule of question, duration of presentation)					
Content					
1. Follow the outline					
2. Signposting and use of transitions					
3. Illustration and examples					
4. Repetition of key words					
Finish					
1. Signal the finish					
2. Summarize the main points					

3. Open the door for feedback and questions					
4. Thank the audience					
Grammar, Style and Pronunciation					
1. Correct language					
2. Coherence Cohesion					
3. Choice of topic and originality					
4. Pronunciation					
5. Tone and intonation					
6. Use of body language and eye contact					
7. Use of visuals and materials…					
8. Filler words and garbage language					

Conclusion

The completion of English for Civil Engineering: Beginner's Level marks a significant milestone in bridging the gap between technical expertise and linguistic proficiency within the domain of civil engineering. Designed to equip learners with the specialized vocabulary, communication skills, and practical applications essential for this field, the manual provides a strong foundation for academic and professional success.

By integrating technical language with real-world engineering contexts, the manual fosters not only the ability to understand and produce technical documentation but also the capacity to engage in collaborative discussions, deliver professional presentations, and navigate the challenges of a globalized engineering environment. The structured lessons and targeted exercises aim to instill confidence in handling diverse linguistic tasks related to civil engineering, from interpreting complex texts to effectively conveying technical information.

As civil engineering continues to evolve, driven by technological advancements and global demands, the foundational skills developed through this manual remain critical. They form the basis for continuous learning, adaptation to new challenges, and participation in multidisciplinary teams addressing complex infrastructure needs. This resource is not an endpoint but a springboard for lifelong learning and professional growth, underscoring the importance of clear communication and technical precision in shaping the built environment of the future.

Key Answers

Needs Assessment

Targeted Skills: Reading and Writing Listening and Speaking	**Duration**: 90 minutes

Section 2:

Task 1: Listen and Answer

1. **The video is about the field of Civil Engineering and its importance.**
2. **True or false**
   1. False - This statement contradicts the factual information provided in the text - the text clearly states that civil engineering and architecture work together.
   2. True
   3. False - Exaggerates the roles mentioned in the text, misrepresenting the factual data.
   4. True
   5. False - This statement contradicts the factual information provided in the text - the text mentions designers working on various projects, including waterslides.
   6. True
   7. False - This statement contradicts the factual information provided in the text - the text clearly states the role of client representatives.
3. **Watch the video for the third time and fill in the gaps with the suitable words**
   1. Civil engineering
   2. Civil engineers
   3. Structures
   4. Transportation engineers

Task 2: Read and Answer

A) Choose the suitable answer

1. b**)** Defining the project goals, scope, and feasibility
2. b) Planning
3. c) Monitoring and Control

B) Answer the questions

1. The five phases of a construction project are initiation, planning, execution, monitoring and control, and closure.
2. The main goal of the planning phase is to lay out a detailed roadmap for the project, including tasks, timelines, resources, budgets, risk management, and quality assurance plans.
3. The significance of the monitoring and control phase lies in its role of tracking project progress and performance, ensuring the project stays on schedule and within budget, and identifying areas requiring corrective action through KPIs.

Task 3: Writing

Criteria: Clarity, coherence, technical accuracy, and grammar.

Introduction to Civil Engineering Terminology

Targeted Skills: Reading and Writing	**Duration**: 90 minutes

Task 1: Giving Examples

Key Terms	**Meaning**	**Example**
Foundation	The base on which a structure rests	The foundation of the building must be strong to support the weight of the structure.
Reinforcement	The process of strengthening concrete by using steel bars or mesh	Reinforcement is crucial for enhancing the tensile strength of concrete.
Aggregate	Material such as sand, gravel, or crushed stone used in concrete	The quality of the aggregate affects the strength of the concrete.
Load-Bearing	Able to support weight	Load-bearing walls are essential for the stability of a building.
Compression	The act of pressing together	Concrete is strong in compression but weak in tension.
Common Verbs		
Excavate	To dig out material from the ground.	The crew will excavate the site before construction begins.
Pour	To cause (a liquid) to flow into a container or space	Workers will pour the concrete into the foundation mold.
Reinforce	To strengthen or support	Engineers decided to reinforce the bridge with additional steel beams.
Erect	To construct or establish	They will erect the scaffolding around the building.
Survey	To measure and map out an area of land	The land must be surveyed before any construction can begin.
Common Nouns		
Blueprint	A detailed technical drawing	The architect reviewed the blueprint with the construction team.
Scaffold	A temporary structure used to support workers	The painters climbed the scaffold to reach the top of the wall.
Beam	A long, sturdy piece of wood or metal used to support weight	The steel beam was installed to support the new floor
Masonry	Stonework or brickwork	The masonry on the building's facade is beautifully crafted.
Surveyor	A person who measures land.	The surveyor marked the boundaries of the property.

Task 2: Fill in the blanks

1. Foundation 2. Survey 3. Excavate 4. Pour 5. Compression	6. Reinforcement 7. Load-Bearing 8. Aggregate 9. Blueprint 10. Scaffold	11. Beams 12. Masonry 13. Surveyor 14. Reinforce 15. Erect 16. Blueprint

Introduction to Civil Engineering

Targeted Skills: Reading and Writing	**Duration**: 90 minutes

Text Comprehension

1. Answer the following questions

1. Constructing and maintaining roads, bridges, tunnels, public buildings, sewer systems, etc.
2. Engineering is often defined as the practical application of theoretical sciences like physics and chemistry
3. Early branches of engineering relied more on empirical knowledge from observation and experience.
4. They were constructed with greater strength than modern standards typically require.
5. Military engineers were tasked with designing and building roads, fortifications, and bridges, as well as demolishing enemy structures using tunnels and explosives.
6. Engineering evolved from a military to a civilian profession, leading to civil engineering.
7. John Smeaton; he developed new waterproof pozzolanic cements for a lighthouse in the English Channel.

2. Main Ideas

The main idea of paragraph one (1) is: 2

The main idea of paragraph one (2) is: 2

The main idea of paragraph one (3) is: 2

The main idea of paragraph one (4) is: 3

Text Exploration

1. Matching words

1. Construction
2. Public buildings
3. Cement
4. Demolition
5. Aqueduct

2. Pronouns Identification

1. Civil engineers
2. Ancient structures (e.g., bridges, arenas, and aqueducts of Rome)
3. John Smeaton

4. Fill the gaps

1. Planning 2. Structures 3. Empirical 4. Theoretical	5. Technology 6. Innovation 7. Education 8. Technology

4.Rewrite in the passive voice

1. New infrastructure is designed by civil engineers.
2. New waterproof cements were developed by John Smeaton.
3. Virtual reality techniques are being used by engineers.
4. Public buildings and sewer systems are maintained by them.
5. Numerical modeling has been enabled by technological advances.

Branches of Civil Engineering

Targeted Skills: Reading and Writing	**Duration**: 90 minutes

Text Comprehension

1. **Read the passage above carefully and answer the following questions.**

1. The main responsibilities of structural engineers include designing and analyzing permanent structures such as buildings, bridges, and tunnels to ensure they are safe, stable, and capable of withstanding various forces like gravity, wind, and seismic activity.
2. Hydraulic engineers contribute to managing water-related hazards by designing systems involving the flow and control of water and other fluids. This includes designing dams, canals, levees, stormwater management systems, and flood control infrastructure to effectively manage water resources and mitigate risks associated with water-related hazards.
3. The key focuses of sanitary or environmental engineering include studying and managing water supply, purification, and sewer systems. Environmental engineers ensure clean and safe water for communities, treat wastewater, and address pollution control and environmental sustainability issues.
4. Continuous education is important for civil engineers because the field of civil engineering is diverse and dynamic, requiring engineers to adapt to evolving demands and technologies. Continuous learning allows engineers to stay updated with new advancements, techniques, and best practices in their respective sub-disciplines.
5. Engineers ensure their projects are economically viable by collaborating with management and government officials to align their ideas with the financial constraints of a project. They design solutions that are not only technically effective but also cost-efficient, ensuring projects can be funded and maintained over time.
6. Considering social and environmental impacts in engineering projects is significant because it ensures that solutions are functional, sustainable, and socially responsible. Engineers must minimize negative impacts on the environment and local communities while enhancing the quality of life for the communities they serve. This involves incorporating green technologies, using sustainable materials, and ensuring projects do not harm local ecosystems or populations.

2. **As you read the text, determine the paragraph in which idea is mentioned. If an idea is not mentioned, write NM.**

1. Structural engineers design dams and canals. - NM

1. Structural engineers focus on permanent structures' safety and stability. - Paragraph 1
2. Structural engineers are responsible for environmental sustainability. - NM
3. Hydraulic engineers manage water flow and control systems. - Paragraph 1
4. Hydraulic engineers design buildings and bridges. - NM

5. Hydraulic engineers ensure clean water for communities. - NM
6. Sanitary engineers focus on soil behaviour. - NM
7. Sanitary engineers study transportation systems. - NM
8. Sanitary engineers manage water supply and pollution control. - Paragraph 1
9. Geotechnical engineers assess ground conditions for construction. - Paragraph 2
10. Geotechnical engineers design mass transit systems. - NM
11. Geotechnical engineers manage construction projects. - NM
12. Transportation engineers focus on sustainable networks. - Paragraph 2
13. Transportation engineers design water purification systems. - NM
14. Transportation engineers develop new construction materials. - NM
15. Construction engineers manage and oversee project execution. - Paragraph 2
16. Construction engineers study rock behaviour. - NM
17. Construction engineers design transportation networks. - NM
18. Materials engineers improve existing materials for construction. - Paragraph 2
19. Materials engineers design foundations. - NM
20. Materials engineers manage water resources. - NM

Text Exploration

1.Match the definitions with the correct terms from the passage.

- Structural Engineering
- Hydraulic Engineering
- Sanitary or Environmental Engineering
- Geotechnical Engineering
- Transportation Engineering
- Construction Engineering
- Materials Engineering

2. Identify what the following pronouns refer to in the passage.

1. **These (1p):** Refers to "buildings, bridges, and tunnels."
2. **They (2p):** Refers to "Geotechnical engineers."
3. **Their (3p) [First Occurrence]:** Refers to "engineers."
4. **Their (3p) [Second Occurrence]:** Refers to "engineers."

3.Fill in each gap with the appropriate word from the given box.

- subfields
- safe
- water
- water
- environmental

Civil Engineering Basics

Targeted Skills: Listening and Speaking	**Duration**: 90 minutes

Task 1: Matching words with their definitions

Design - b Construct - c Analyze - d Foundation - a Survey – i	Maintain - h Plan - g Evaluate - j Inspect - d Infrastructure - e

Task 3: True and False

1. False - This statement contradicts the factual information provided in the text - the text says that civil engineering is one of the oldest and most diverse branches of engineering.
2. True
3. False - Exaggerates the responsibilities mentioned in the text, misrepresenting the factual data.
4. True
5. False - This statement contradicts the factual information provided in the text - the text says that environmental engineers focus on protecting the environment and public health.
6. True
7. False - Exaggerates the responsibilities mentioned in the text, misrepresenting the factual data.

Task 4: Listen attentively and answer the questions

1. Civil engineering is one of the oldest and most diverse branches of engineering that deals with planning, design, construction, and maintenance of infrastructure projects such as buildings, bridges, roads, dams, and airports.
2. Having a strong foundation in mathematics and physics is essential for understanding the fundamental principles governing the behaviour of structures and materials in civil engineering projects.
3. Key disciplines in civil engineering include structural engineering, geotechnical engineering, transportation engineering, environmental engineering, water resources engineering, and construction engineering and management.
4. Structural engineers ensure the safety and stability of structures by considering factors like wind, earthquakes, and the weight of occupants and belongings during the design and analysis process.
5. Geotechnical engineers study soil and rock mechanics to determine material properties and their impact on infrastructure projects like foundations, retaining structures, and tunnels.
6. Transportation engineers consider factors like traffic flow, vehicle dynamics, and pedestrian/cyclist needs when designing efficient Transportation Systems.

7. The design process in civil engineering involves problem identification, data collection, analysis, design creation, and overseeing construction to ensure projects are completed successfully.

Task 5: Watch the video again and fill in the gaps with the suitable words.

1. buildings and roads **2** structural behaviour and design efficiency **3** structural engineering, geotechnical engineering, transportation engineering, environmental engineering, water resources engineering, and construction engineering **4** safety and stability of buildings and bridges **5** soil and rock mechanics for safe infrastructure design	**6** efficient transportation systems **7** the environment and public health **8** water distribution and treatment facilities **9** on time and within budget **10** problem identification, data collection, analysis, design, and construction oversight

Principal Construction Materials

Targeted Skills: Reading and Writing	**Duration**: 90 minutes

Text Comprehension

1. **Answer the questions**

1. The major construction materials in earlier times were wood and masonry, which included brick, stone, clay, and tile.
2. The Greeks and Romans occasionally reinforced their buildings with iron rods. For example, the columns of the Parthenon in Athens had holes that once held iron bars.
3. Pozzolana is a superior waterproof cement developed by the Romans, made by mixing water, lime, and sand with a fine powder from volcanic rock found near Pozzuoli. It was significant because it could harden without needing air contact, making it a hydraulic binder, unlike traditional lime mortar.
4. Portland cement is a mixture of limestone and clay, heated and ground into a powder, invented in 1824 by bricklayer Joseph Aspdin.
5. Steel and concrete are considered complementary materials in construction because concrete excels in compression strength while steel has high tensile strength. They expand and contract at nearly the same rate, allowing them to work together in situations involving both compression and tension. Steel rods embedded in concrete create reinforced concrete, which is used in structures where tension occurs.

2. **Determine the main idea**

Paragraph 1: b) Traditional construction materials and their uses.

Paragraph 2: a) The reinforcement techniques used by Greeks and Romans**.**

Paragraph 3: b) The process and versatility of using concrete in construction.

Paragraph 4: a) The complementary properties of steel and concrete.

Paragraph 5: c) Why steel is the most commonly used alloy in the construction industry.

Text Exploration

1. **Match the definitions with the correct terms from the passage:**
   b) Tile
   a) Mortar
   b) Pozzolana
   b) Formwork
   c) Concrete
2. **Pronouns Identification**

Which = Portland cement concrete

They = The Greeks and Romans

It = Portland cement

They = steel and concrete

3. Fill in each gap with the appropriate word from the given box.

1. Bricks or stones were bonded together with a mixture called **mortar**.
2. The Romans developed a waterproof cement known as **pozzolana**.
3. **Concrete** is described as an "artificial stone" composed of cement, water, and aggregates.
4. Steel embedded in concrete to create **reinforced** concrete enhances its tensile strength.
5. **Portland** cement is a mixture of limestone and clay, heated and ground into a powder.

Construction Process

Targeted Skills: Listening and Speaking	**Duration**: 90 minutes

Task 3: Watch the video and determine whether the following statements are true or false

Video Link: (83) 12 Steps of Construction - YouTube

1. False - This statement contradicts the idea expressed in the text, as the text does not mention the approval of construction drawings before awarding the project.
2. True
3. False - This statement contradicts the factual information provided in the text - the text says the task is to clear obstructions and debris.
4. True
5. False - This statement contradicts the factual information provided in the text - the text says a perimeter fence should be constructed.
6. True
7. False - This statement contradicts the factual information provided in the text - the text says the excavation works begin after the layouts are completed.

Task 4: Watch the video and listen attentively to answer the following questions

Video Link: **(83) 12 Steps of Construction - YouTube**

1. The minimum excavation level for the footing to rest should stick to 1 meter below the gate level or the 0.00 level.
2. Proper caution is necessary during the excavation stage because it is a massive activity.
3. Compacting of the excavated surface should be performed once we reach the desired excavation level.
4. The final compacted layer should reach a degree of compaction not less than 95% of the maximum dry density.
5. An anti-termite treatment on the ground should be considered to prevent termite damage.
6. PCC used for the footing rebar is usually composed of a 10 mm thick lean concrete.
7. At least two coats of bitchman paint should be applied for both footing and stub columns.

Task 5: Watch the video again and fill in the gaps with the suitable words.

Video Link: (83) 12 Steps of Construction - YouTube

1. drawings by the authority and client 2. construction 3. set up 4. reference points and construction grid lines 5. existing structures	6. PCC follows excavation to desired level 7. installed next 8. done 9. bitchman paint is completed 10. boundaries and levels

Glossary

Abutment: A structure that supports the ends of a bridge or arch.

Aggregate: Crushed stone, gravel, or sand used in concrete mixes.

Air-entrainment: Adding tiny air bubbles to concrete to improve durability.

Allowable Load: The maximum load a structure can carry safely.

Anchor Bolt: A bolt embedded in concrete to secure structures.

Asphalt: A sticky, black, and highly viscous liquid used for road surfacing.

Backfill: Material used to refill an excavation.

Batter: A slope or receding upward slant of a wall.

Bearing Capacity: The capacity of soil to support the loads applied to the ground.

Bearing Wall: A wall that supports vertical load.

Bending Moment: The internal force induced in a structural element when an external force is applied.

Billet: A length of metal used in construction.

Bitumen: A binding material used in road construction.

Blasting: Using explosives to break rock.

Blue Print: A detailed plan or drawing.

Bolster: A temporary support.

Bond: The adhesion between materials.

Bracket: A structural support projecting from a wall.

Bracing: Structural support used to stabilize.

Brick: A building material made from clay or shale.

Bridge: A structure built to span physical obstacles.

Bulldozer: A heavy vehicle with a large blade for moving earth.

Caisson: A watertight structure used for construction in water.

Cantilever: A projecting beam or structure supported only at one end.

Caulking: Material used to seal joints.

Cement: A binder used in construction that sets and hardens.

Centerline: A line through the middle of a structure.

Chamfer: A beveled edge.

Chute: A sloping channel for transporting materials.

Cladding: Exterior finish of a building.

Cleat: A device for securing objects.

Column: A vertical structural element that transmits load.

Compaction: The process of increasing soil density.

Concrete: A composite material made from cement, water, and aggregates.

Conduit: A pipe or channel for enclosing electrical wires.

Contour: Lines on a map representing elevation.

Coping: A covering course on a wall.

Creep: The slow, continuous deformation of materials under stress.

Cribbing: A framework of timbers for support.

Culvert: A tunnel carrying a stream or open drain under a road.

Curtain Wall: An exterior wall that does not carry any load.

Cut-and-fill: Earth-moving process to create level ground.

Datum: A reference point for measurement.

Datum Line: A reference line.

Dead Load: The static load from the weight of the structure itself.

Deformation: Change in shape due to stress.

Density: Mass per unit volume.

Dewatering: Removal of water from construction sites.

Diaphragm: A structural element that transmits lateral loads.

Ductility: The ability of a material to deform under stress.

Earthwork: The process of moving soil.

Efflorescence: The migration of salts to the surface of concrete or masonry.

Elevation: The height above a reference level.

Embankment: A raised structure to hold back water or carry a roadway.

Excavation: The process of digging out material from a site.

Expansion Joint: A joint allowing for thermal expansion.

Falsework: Temporary structures for support.

Facade: The front of a building.

Fascia: A board covering the ends of rafters.

Fatigue: Weakening of a material due to repeated stress.

Finial: An ornament at the top of a structure.

Flash Point: The lowest temperature at which vapors ignite.

Footing: The base of a foundation.

Formwork: Temporary molds for shaping concrete.

Fracture: The breaking of a material.

Gabion: A cage filled with rocks for erosion control.

Gantry: A frame structure for supporting heavy equipment.

Girders: Large beams supporting structures.

Grade: The slope or level of a surface.

Grade Beam: A horizontal load-bearing foundation member.

Gravel: Loose aggregation of rock fragments.

Grouting: The process of filling voids with a fluid material.

Haunch: The part of a beam that strengthens it.

Hazard: A potential source of harm.

Hydraulic Cement: Cement that sets and hardens through a chemical reaction with water.

Hydrology: The study of water movement.

In-situ: Construction done at the location.

Junction: A point where two or more elements meet.

Keystone: The central stone in an arch.

Lateral Load: Load applied horizontally.

Levelling: Determining the height of different points.

Lintel: A beam supporting the wall above a window or door.

Load-Bearing: Capable of supporting weight.

Masonry: Construction using individual units bound together.

Modulus of Elasticity: A measure of a material's ability to deform elastically.

Mortar: A mixture used to bond building materials.

Node: A point in a structure where elements join.

Overburden: Soil and rock overlying a mineral deposit.

Parapet: A low protective wall along the edge of a roof.

Pile: A long, slender column driven into the ground for support.

Plinth: The base of a column.

Pozzolana: A volcanic ash used for hydraulic cement.

Prestressing: Applying a force to concrete before it takes any load.

Punching Shear: A type of failure in concrete slabs.

Quarry: A place where stone is extracted.

Rafter: A beam forming part of the roof structure.

Rebar: Steel reinforcing bars in concrete.

Retaining Wall: A structure to hold back soil.

Riprap: Loose stone used to protect soil from erosion.

Roadbed: The foundation on which the road lies.

Rock Armour: Large rocks placed to protect shorelines.

Runoff: Water flow over land.

Scaffolding: Temporary structure for construction workers.

Sedimentation: The process of settling particles.

Shear Force: A force causing two adjacent parts to slide past each other.

Shoring: Temporary supports for structures.

Silt: Fine soil particles.

Slab: A flat, horizontal surface made of concrete.

Slope: The incline of a surface.

Soil Mechanics: The study of soil properties and behavior.

Span: The distance between two supports.

Spalling: The breaking off of concrete.

Stability: The ability of a structure to remain intact.

Stress: Internal resistance to external force.

Strut: A structural component resisting compression.

Subbase: Layer of material under a pavement.

Subgrade: The native soil prepared to support a structure.

Superstructure: The part of a structure above the foundation.

Surveying: Measuring land and its features.

Suspension Bridge: A bridge with cables supporting the deck.

Swale: A low area designed to manage water runoff.

Template: A pattern or mold used in construction.

Tensile Strength: The resistance of a material to breaking under tension.

Tension: The state of being stretched.

Thermal Expansion: Expansion of material due to heat.

Thrust: A reaction force described by Newton's third law.

Tie Beam: A horizontal beam connecting two rafters.

Timber: Wood used in construction.

Topography: The arrangement of natural and artificial features.

Truss: A framework of beams forming a rigid structure.

Tunneling: The process of excavating tunnels.

Uniform Load: A load distributed evenly.

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