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CIVIL ENGINEERS – SHAPING THE WORLD

Учебное пособие

Нижний Новгород
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CIVIL ENGINEERS – SHAPING THE WORLD

Утверждено редакционно-издательским советом университета
в качестве учебного пособия

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Учебное пособие составлено на материале аутентичных текстов интернет-сайтов и журналов (США, Великобритания, Канада) и предназначено для студентов строительных специальностей. Основной целью пособия является развитие иноязычной коммуникативной компетенции студентов в сфере их будущей профессиональной деятельности, а также формирование профессионально важных качеств современного инженера. Пособие основано на модульном подходе к обучению иностранному языку.

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Civil engineers have been shaping our cities for centuries, helping develop the new and protect the old.

Module 1

Civil Engineering – a “Challenging” Profession?

"The profession of Civil Engineering is the art of directing the great sources of the power of Nature for the use and convenience of Man." (from Wikipedia)

In this module you will

listen, read and talk about:

- responsibilities, occupation tasks and work activities of civil engineers
- knowledge, skills and abilities civil engineers should possess
- civil engineering specialities

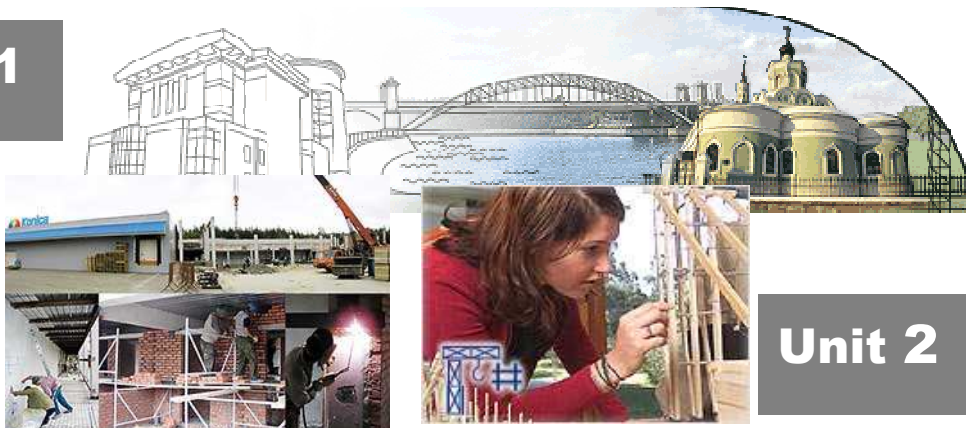
learn how to:

- express opinion
- agree/disagree
- summarise information in the form of a table

practise:

- second conditional
- modal verbs and their equivalents (can, be able to, must, have to, should)
- infinitive of purpose
- pronunciation of topical vocabulary

Unit 1



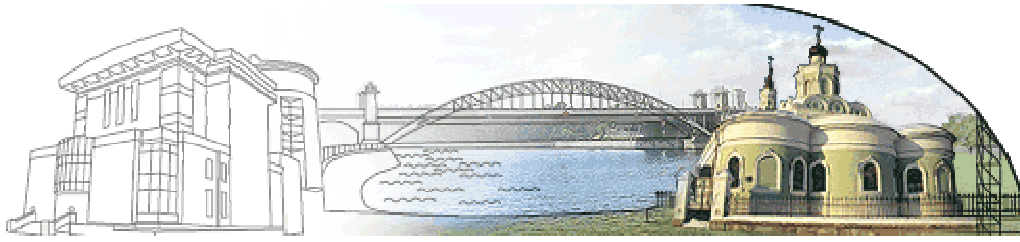
Unit 2

Unit 3



Unit 1

What is Civil Engineering?



"When you understand civil engineering, you see the world differently."

(Institution of Civil Engineers www.ice.org.uk)

Lead in

Your future profession is civil engineering.

What do you know about it? What do civil engineers do?

What are they responsible for?

Activity 1

You are going to read an extract from the website of Institution of Civil Engineers in the UK, which promotes Civil Engineering.

1. Before reading make sure that you understand English words and expressions in the left-hand column, matching them with their Russian equivalents in the right-hand column.

1. rely on	A. загрязнение
2. processing and recycling waste	B. метро
3. find solutions to problems	C. полагаться на
4. pollution	D. переходить по подземному переходу
5. network of roads	E. железные дороги
6. underground system	F. проектировать и строить
7. walk through an underpass	G. найти решение проблем
8. bridge	H. устойчивое развитие энергетики
9. design and build	I. многоэтажные автостоянки

10. railways	J. подача чистой воды
11. tunnels	К. переработка и утилизация отходов
12. tall structures	L. мост
13. multi-storey car parks	М. сеть дорог
14. train stations	N. туннели
15. supply of clean water	О. высотные сооружения
16. sustainable energy	Р. железнодорожные вокзалы

• 2. Read the text “What is Civil Engineering?” and find the answers to the questions in Lead-in section.

- Do they coincide with your answers?
- Have you found any new information about your future profession?
- Would you like to add something to the text?

What is civil engineering?

Civil engineering is all about people. It’s the work that civil engineers do to develop and improve the services and facilities we, the public, all use.

We rely on civil engineering every day for a variety of things: from supplying energy and clean water to our homes, to processing and recycling our waste, to finding solutions to problems like pollution.

What do civil engineers do?

To understand what civil engineers do, you need to think about what you do in the first hour after you wake up on a Monday morning.

Culture corner

The Institution of Civil Engineers (ICE) is a registered charity that strives to promote and progress civil engineering.

ICE was founded in 1818 by a small group of idealistic young men. Their aim is to "foster and promote the art and science of civil engineering". Now ICE represents around 80,000 members worldwide.

You clean your teeth using the running water in your bathroom. Have a cup of tea or coffee. You travel to work on a finely constructed network of roads or on a train or underground system. You park your car or grab another cup of coffee at the train station before heading to the office. You might even walk through an underpass or over a bridge before finally settling at your desk. None of this would have been possible without civil engineers.

Civil engineers design and build bridges, roads, railways, and tunnels. They design and build tall structures and large buildings such as multi-storey car parks, train stations, and even the Olympic stadium.

Without civil engineers we wouldn't have a constant supply of clean water, or sustainable energy to help us save our planet. Without civil engineers the world we live in would be completely unrecognisable.

(Adapted from <http://www.ice.org.uk/What-is-civil-engineering/What-do-civil-engineers-do>)

Activity 2

Civil engineering in your town

1. Can you give any examples of civil engineering work in your town? 2. This everyday scene of a town shows different aspects of civil engineering found in everyday life. Match the number in the picture to civil engineering description in the box. See if you can find your examples in this picture.

Airports and runways

Bridges

Civil engineer directing and managing a project

Coastal protection

Electricity pylons

Housing

Infrastructure for water supply and sewage treatment

Lighting
 Network of roads
 Office-based civil engineers working on designs
 Power station
 Railway system
 School
 Stadium
 Tunnel and underground systems

Activity 3 Grammar

Second conditional

If + past simple, would + infinitive without to

This describes an unlikely situation and its probable result.

*If we **didn't have** civil engineers we **wouldn't live** in cities.*

Instead of *would* we can use *might* or *could*, depending on the meaning.

*If he **spoke** English fluently he **could work** in a multinational company.*

1. Find examples of Second conditional in the text.
2. Fill in the gaps with Second conditionals of the verbs in brackets.
 1. If civil engineers _____ (build) the Great Wall of China today, it _____ (cost) £ 300 billion.
 2. If I _____ (have) a degree in Civil Engineering I _____ (have) a chance to get a well-paid job.
 3. If I _____ (study) at Melbourne university I _____ (have) the opportunity to specialize in nanotechnology.
 4. If I _____ (be) an office-based civil engineer I _____ (work) on computer designs.
 5. If I _____ (work) in aerospace engineering I _____ (be) designing structures for use in space.
 6. If I _____ (do) an outstanding civil engineering or construction project I _____ (receive) an ICE International Medal.

3. Complete the following sentences.

1. If I had a chance to study abroad ...
2. If I didn't choose to become a civil engineer ...
3. If I worked on a construction site ...
4. If I were the chief architect of Nizhny Novgorod ...
5. If

4. Discuss what would happen if a particular aspect of civil engineering did not exist and how it would affect our life (see the picture in Activity 2).

Activity 4

1. Read the text "Our World and The Civil Engineer" and fill in the gaps with the words from the box:

water supplies, facilities, meet technological challenges, coastal protection, waste (*3), dams, harbours, satisfy the demands (*2), treatment, clean water (*2).

The Profession

Do you know?

Brunel, Sir Marc Isambard 1769—1849, British engineer and inventor. His projects included building the old Bowery Theater (burned in 1821) and constructing a canal between Lake Champlain and the Hudson, building bridges and docks, the construction of the Thames Tunnel. He also invented many mechanical labor-saving devices. In the work on the tunnel Sir Marc was assisted by his son, **Isambard Kingdom Brunel**, 1806—59, British civil engineer and an authority on railway traction and steam navigation. He is best known, however, for his designing and construction of ocean steamships.

Civil engineers are responsible for the muscles which hold our society together – bridges, roads, railways, _____, airports, docks, _____ and tunnels. They also provide and maintain its heart and lungs – _____ and natural resources in, _____ out; transport systems to move everything safely and efficiently; and energy to make it all work.

They are very much concerned with the environment: _____, pollution reduction, protection of existing _____ and _____ disposal.

Robert Stephenson (1803 - 1859) was an English civil engineer. He built railway locomotives. He constructed a number of well-known bridges including the High Level Bridge at Newcastle-upon-Tyne and the Royal Border Bridge. Despite officially being rivals Robert Stephenson shared a friendship with Isambard Kingdom Brunel and they would often help each other on various projects.

Telford, Thomas, 1757—1834, Scottish civil engineer. He greatly improved road building in England and Scotland. His engineering works include harbors and docks, many notable bridges and an aqueduct across the Dee; he was engineer-in-chief of the Caledonian Canal. He is buried in Westminster Abbey.

What famous Russian Civil Engineers do you know?

What are they well known for? Prepare a short report about one of them. Use information from the Internet, an encyclopedia or any other sources.

The civil engineer's job usually begins with the determination of a need. It may be the need to free a town centre from increasing traffic, the need to provide _____ or to build a bridge.

There may be several solutions to the problems and the civil engineer will recommend the best option to _____.

The Future

We have all heard of famous civil engineers from the past – Isambard Kingdom Brunel, Thomas Telford and Robert Stephenson for example. They were innovators in their time and achieved some remarkable feats of civil engineering.

But civil engineering today is even more about innovation as civil engineers have _____. Projects such as the Channel Tunnel, the Thames Barrier, the Humber Bridge, Canary Wharf and offshore oil platforms in the North Sea are just a few of the modern day achievements using methods and

ideas never tried before.

Civil engineers will continue to _____ of the civilized world – providing safe _____ and _____ water _____ and developing irrigation and transport systems so communities can improve their quality of life.

And who knows what lies ahead? There are unimagined opportunities throughout the world and even beyond our own planet.

Activity 5 Pronunciation

1. Underline the stressed syllables. Then mark whether the stresses are on the same syllables (✓) or not (X).

1. chall.enge ci.vil chann.el ✓
2. rail.way de.mand air.port X
3. har.bour treat.ment supp.ly
4. trans.port main.tain pro.vide
5. so.lu.tion pro.tec.tion re.duc.tion
6. hous.ing sew.age net.work
7. comm.u.ni.ty in.fra.struc.ture inn.ov.at.or
8. off.shore tunn.el re.source
9. un.i.ma.gined i.rri.ga.tion en.gi.nee.ring

2. Put the words from the box in the correct column, according to the pronunciation of the letters in bold. Which word doesn't belong to any column?

society, air port, provide, main tain, environment, rely, recycle, disposal, satisfy, inn ovation, lighting, achievement, civilized, irr igation, design, quality, id ea, unimagined, pylon, electricity

/aɪ /	/ɪ /	/i : /	/aɪə /	/ɛə /
	innovation			

Activity 6

Re-arrange these “word dominoes” in the right order so that each makes a strong word partnership. Make a list of the word pairs you create. The first and last domino are half-blank.

1.		sustainable
2.	reduction	waste
3.	oil platforms	modern day
4.	energy	natural
5.	treatment	irrigation
6.	disposal	solutions
7.	resources	pollution
8.	waste	offshore
9.	achievements	waste water
10.	to problems	to process and recycle
11.	system	electricity
12.	pylon	

Activity 7

1. In the text “Our World and The Civil Engineer” it is stated that civil engineering has unimagined opportunities throughout the world and even beyond our planet. What do you think these opportunities are? Use the word partnerships from Activity 6 and the Language box below to help you express your ideas.

Language Box

Expressing your opinion	
I think...	In my view/ opinion...
I believe...	From my point of view...

2. Read the following statements about civil engineering and say if you agree or disagree with them. Prove your points of view referring to the texts you read in the unit.

- Civil Engineers are among the first to use the available high technologies.
- Civil Engineering is truly the profession that has shaped our past and is helping define and build our future.
- “Scientists explore what is; engineers create what has never been.” (Marc Isambard Brunel)
- Civil Engineering relies more than any other engineering discipline upon communication skills... and sensitivity to the needs of society.

See Language Box to help you to agree and disagree.

Agreeing	Disagreeing
Absolutely/ Exactly	That's not true
I absolutely/ fully/ certainly/ agree	I don't think that's right
Right/ That's right	I'm not so sure...
I suppose so, but...	Yes, but...

Unit 2

Studying civil engineering



Lead-in

People ask “is civil engineering for me?”

The following quiz will help to find out if civil engineering career fits you.

1. Do you get good grades in math and science?
2. Do you enjoy knowing how things work?
3. Do you ever think of new or better ways to do things?
4. If you get a gift that says “Assembly Required”, do you put it together yourself?
5. Do you like to work with computers and play video games?
6. Do you like to do mazes and jigsaw puzzles?
7. Do you usually make sound decisions, and do people trust your judgment?
8. Can you express yourself easily and clearly?
9. Do you work well with others?
10. Do you like to know “why”?

Answers:

If you answered “Yes” to most of the questions, your potential for success in civil engineering is high.

Activity 1

1. What subjects are the most important to study if you want to become a civil engineer?

2. Read what subjects The Institution of Civil Engineers recommends to British students and compare with your ideas.

What subjects should I choose?

1. Maths

If you want to become an engineer, you'll have to study maths. Engineers use maths to understand the theory of engineering and to analyse materials and structures.

For most engineering courses at university you need to have a maths A-level. You could also take further maths, if it's available as an option, but further maths is helpful, not essential. (There will also be some maths in the first year of your university course.)

Culture corner
The A Level is a school leaving qualification offered by educational bodies in the United Kingdom.

2. Physics

The second most important subject to study at this stage is probably physics. The laws of physics dictate how and why things behave the way they do. Studying physics will help you understand concepts such as energy, forces and motion, which are key to solving the problems that engineers face on a daily basis.

There are lots of other useful subjects.

3. Geography and geology

These subjects will build your understanding of the physical world, like the behaviour of rivers, tides and currents in the sea, and the strengths of different rocks and soils.

4. ICT

If you want to develop skills in using computer software, you must study ICT. You'll be able to apply those skills to the programmes you'll use as a civil engineer.

5. Languages

Learning a modern foreign language will be useful if you want to work abroad.

Generally, it's best to choose what you enjoy and are good at. You might also want to look at some university websites to see if they have any specific requirements or preferences.

**3. Which word combinations with “skills” can you find in the text?
What other word combinations can you form?**

4. Find in the text English equivalents to the following words and word combinations:

доступный (part 1)

существенный (part 1)

вариант (part 1)

энергия, сила и движение (part 2)

важный / ключевой для решения проблем (part 2)

характеристики рек, приливов и морских течений (part 3)

прочность горных пород и грунта (part 3)

конкретные требования (part 5)

предпочтения (part 5)

<p>Activity 2 Grammar review</p>

Modal verbs

Very often modal verbs are used to describe responsibilities and abilities of people.

1. Look through the text again and find modal verbs. (See Table 1 for reference).

Table 1. Modal verbs and their equivalents.

1. CAN	1. Умение, возможность что-то делать.
2. BE ABLE TO	2. Заменяет глагол CAN в будущем времени и в сочетании с другими глаголами.
3. MUST	3. Долженствование.
4. HAVE TO / NEED	4. Необходимость что-то сделать.
5. MAY / MIGHT / COULD	5. Возможность и вероятность совершения действия в настоящем и будущем времени.

2. Check if you remember how to use modal verbs. Complete the sentences with the necessary modal verbs.

1. How _____ you become a civil engineer?
2. Modern civil engineers _____ be good specialists in information technology, computer-aided design as computers are becoming increasingly important.
3. During the course of studies graduate and undergraduate students _____ complete a number of research projects.
4. Every morning we turn on the tap, boil a kettle, use the bathroom, walk along the road, cross a bridge or take a train. Without civil engineering we wouldn't _____ do any of these.
5. In future civil engineers _____ find new ways to minimize problems and to maintain the quality of the world in which we live.
6. If you study Civil Engineering you _____ learn how to use maths and science to design big construction projects.

3. Make up some sentences, describing your abilities and responsibilities as a civil engineering student. Use different modal verbs.

Activity 3**University Course for Engineering Degree**

Study the descriptions of the Engineering (Civil and Structural) course at University of Aberdeen and answer the questions.

- 1. How many compulsory courses are there in the first year? / second year?**
- 2. What optional courses can students choose?**



Engineering (Civil and Structural) (BEng)

A degree in Engineering (Civil and Structural) (BEng) is taught via a selection of compulsory and optional courses to enhance your learning and prepare you for a future career or further study. Depending on the number of compulsory and optional courses offered by your degree, you can also choose other courses which fit your timetable.

First Year*Compulsory Courses*

- Principles of Electronics
- Fundamentals of Engineering Materials
- CAD and Communications in Engineering Practice
- Fundamental Engineering Mechanics
- Engineering Mathematics 1

Optional Courses

- Select a further course, e.g. GROUP DESIGN PROJECT, SUSTAINABILITY: CHALLENGES AND OPPORTUNITIES.

Second Year*Compulsory Courses*

- Engineering Mathematics 2
- Process Engineering

- Fluid Mechanics and Thermodynamics
- Design and Computing in Engineering Practice
- Solids and Structures
- Electrical and Mechanical Systems

Optional Courses

- Select a further course, e.g. THE DIGITAL SOCIETY, SCIENCE AND THE MEDIA.

- 1. Write the names of the compulsory courses you study at our University in the first and second years. Do you have any optional courses?**
- 2. Are there any similar courses at Aberdeen University?**

Activity 4

To prepare yourself for a career in civil engineering you should know the tasks you will have to perform in your future job. AMERICA'S CAREER INFONET provides a list of the most important tasks in the field of civil engineering.

Before reading match the following key words/expressions in English with their Russian equivalents:

1. survey report	a. почва, почвогрунт, грунт;
2. blueprint	строительный грунт
3. aerial photography	b. оборудование, оснащение, арматура,
4. traffic pattern	оснастка
5. environmental condition	c. гидродвигатели и гидротехнические сооружения
6. impact	d. условия окружающей среды,
7. construction activities	окружающие условия; внешние условия
8. quantity	e. схема движения

9. project feasibility	f. чертеж
10. project site	g. прочность; предел прочности
11. equipment	фундамента/ основания
12. labor (Am) = labour (Br)	h. асфальт
13. safety and sanitation standards	i. труд; рабочая сила, рабочие
14. hydraulic systems and structures	j. сильное воздействие; влияние
15. modifications	k. производственный персонал
16. soil	l. количество
17. strength of foundations	m. акт осмотра и экспертизы
18. concrete	n. бетон
19. asphalt	o. аэрофотосъемка
20. industrial personnel	p. модификация; модифицирование; видоизменение
	q. строительство
	r. правила техники безопасности и санитарного контроля (санитарно- профилактические мероприятия)
	s. осуществимость/выполнимость проекта/строительного объекта
	t. строительная площадка

Activity 5
Pronunciation

Put the words from the box in the correct column, according to the pronunciation of the letters in bold.

study, computer, sur vey, hydraulic, conduct, blue print, industrial, founda tion, include, structure, occupation, construction, focus						
as in pu rp <u>l</u> e/murder	as in music	as in ru de	as in cu t	as in da ughter	as in hou se	as in su pply
	documenting					

Activity 6

1. Read the table with the tasks and complete the gaps using the words in the box:

<p>safety or sanitation standards, construction, hydraulic systems, program modifications, soil, aerial photography, labour, environmental conditions, equipment, blueprints</p>
--

- Analyze survey reports, maps, drawings, _____, _____, and other topographical or geologic data to plan projects.

- Conduct studies of traffic patterns or _____ to identify engineering problems and assess the potential impact of projects.

- Estimate quantities and cost of materials, _____, and _____ to determine project feasibility.

- Inspect project sites to monitor progress and design _____.

- Plan and design transportation or _____ and structures, following construction and government standards.

- Provide technical advice regarding design, construction, or _____ to industrial and managerial personnel.

- Direct _____ activities at project site.

<i>Do you know?</i>

<p>A blueprint is a plan or design documenting an architecture. The name comes from the photographic print composed of white lines on a blue background commonly used in the past for copying architectural plans and engineering drawings. The blueprint process was developed by the British astronomer Sir John Herschel in 1840.</p>

<p>Aerial photography is the taking of photographs from above with a camera placed on an aircraft, balloon, rocket, kite or similar vehicle. It was first practised by the French airman Nadar in 1858. Aerial photography is used in cartography, land-use planning, movie production, environmental studies, espionage, commercial advertising, and other fields. Aerial photos are often processed by a GIS (geographic information system).</p>
--

- Test _____ and materials to determine the strength of foundations, concrete, asphalt, or steel.

2. The following verbs all relate to civil engineering tasks and activities.

Cross out the word/ phrase which cannot go with the verb:

to determine - project feasibility/ a position/soils

to estimate – quantity / cost / size / asphalt

to conduct studies - industrial personnel / of environmental conditions / of traffic patterns

to identify – labour / problems / quantity / impact

to direct – a research project / construction activities / feasibility / design

to provide – technical advice / building materials / impact

to inspect – project site / work / quantity

to monitor – concrete / progress / sanitation standards / labor costs

to plan – a hydraulic structure / topographical data / the work on ...

to design – a building /a transportation system / progress /a project

to test – strength of foundation /a design /soil / equipment

3. Use the phrases above to describe stages of a construction project:

1. Paperwork (requirements)

To design a building, ...

2. Budget

3. Materials

4. Staff and Human Resources

5. Construction

To monitor sanitation standards, ...

Activity 7

To perform all the tasks efficiently a civil engineer must have certain knowledge, skills and abilities.

American Society of Civil Engineers (ASCE) presents a list of most important **Knowledge, Skills and Abilities** (KSAs) in different fields, necessary for Civil Engineers.

Knowledge

1. Match the following definitions to the corresponding type of knowledge:

Knowledge: engineering and technology, mechanics, design, public safety and security, mathematics, economics and accounting (бухгалтерский учет), administration and management, law and government, building and construction, computers and electronics, physics.

_____ — Knowledge of materials, methods, and the tools involved in the construction or repair of houses or other structures such as highways and roads.

_____ — Knowledge of physical principles, laws, and their applications to understand fluid, material, and atmospheric dynamics; mechanical and electrical processes.

_____ — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, and equipment to the design and production of various goods and services.

_____ — Knowledge of processors, chips, electronic equipment and computer hardware and software.

_____ — Knowledge of design techniques, tools, and principles involved in production of technical plans, blueprints, and models.

_____ — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

_____ — Knowledge of laws, legal codes, court procedures, and government regulations.

_____ — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

_____ — Knowledge of business and management principles involved in strategic planning, leadership technique, and coordination of people and resources.

_____ — Knowledge of relevant equipment, policies, and strategies for effective security operations for the protection of people, data, and property.

_____ — Knowledge of economic and accounting principles and practices, the financial markets and banking.

Skills and Abilities

2. Complete the definitions of skills and abilities using the following verbs:

to come up with	to identify	to do
to solve	to arrange	to try
to remember	to use	to communicate
		to recognize

Critical Thinking — using logic _____ the strengths and weaknesses of alternative solutions.

Negotiation— bringing others together _____ to reconcile differences (устранять разногласия).

Science — using scientific rules and methods _____ problems.

Active Learning — understanding how _____ new information for current and future problem-solving and decision-making.

Instructing — teaching others how _____ something.

Problem Sensitivity — the ability _____ when something is wrong or there is a problem.

Speaking — The ability _____ information and ideas in speaking so others will understand.

Information Ordering — The ability _____ things or actions in a certain order according to a specific rule (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Originality — The ability _____ unusual or clever ideas, or to develop creative ways to solve a problem.

Memorization — The ability _____ information such as words, numbers, pictures, and procedures.

2. Work in pairs. Put the knowledge, skills and abilities in the table below:

	Not Important	Important	Extremely important
Knowledge			
Skills & Abilities			

Compare your tables with your partners' ones. You are going to explain your points of view. Use the information above to help you.

Activity 8

Discuss the questions:

What knowledge, skills and abilities have you already got?

What knowledge do you have to get?

What skills and abilities do you have to develop?

Activity 9

Grace and Austyn are studying Civil Engineering at Aberdeen University.

Read what they say about their choice of profession and their career plans.

Which of the students

1. has been abroad?
2. has been interested in engineering since very young age?
3. wants to work on a project site?

4. took part in a construction project?
5. wants to satisfy the demands of society?
6. cares about the future impact of engineering projects?

Grace Wilkinson



Why civil engineering?

I think it was a combination of being a creative and mathematical person. After visiting cities like London and New York, I initially wanted to design buildings. But I decided on civil engineering because it will give me the chance to apply maths to both design and construction.

I did summer work experience at Galliford Try (a construction company) and learned a lot. It was a really great experience to see the project when it was nearly finished, especially after hearing about the problems the company had to solve.

The future

I think I'd like to work on long-lasting and sustainable projects. The biggest thing that inspires me to become a civil engineer is the scope and importance of civil engineering. Not just how projects benefit everyday lives, but also how the engineering of today will affect the future.



Austyn Lloyd

Why civil engineering?

When I was a child, I got interested in how structures and infrastructure work and their importance to society. I love the thought of being a civil engineer and creating things that improve people's lives, like building a dam to provide water or a bridge to link communities.

The future

I want to manage structural civil engineering projects, but I'd also like to do field work so I can get involved in lots of different activities.

Discuss with your partner:

- 1. How would you explain your choice of profession?**
- 2. What are your career plans?**

Unit 3

Specialities



“Civil engineering is an umbrella field comprised of many related specialities.”(from Wikipedia)

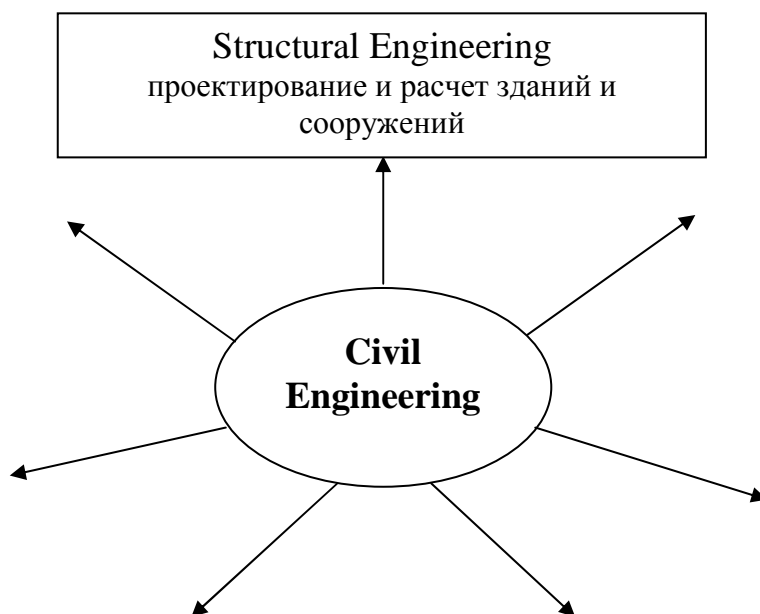
Lead-in

Civil engineering is the broadest of the engineering fields. In fact, engineering was once divided into only two fields - military and civil. What specialities of civil engineering do you know? **Brainstorm your ideas and complete the diagram using either English or Russian language.**

Do you know?

Early English verb *engine* meant "to contrive" (придумывать, изобретать; разрабатывать) or "to devise" (выдумывать, изобретать). Thus the engines of war were devices such as catapults, floating bridges, and assault towers, and the designer was called the "engineer" or military engineer.

His counterpart was the civil engineer who applied the same knowledge and skill to design structures, streets, water-supply and sewage systems, and other projects of benefit to the civilian population.



Activity 1
Civil
Engineering
Specialties

1. Read quickly the descriptions of the specialties given by American Society of Civil Engineers

(<http://www.asce.org/kids/tech.cfm>) and match them with the names of the specialties (the missing words

correspond to the names of the specialties).

Environmental Engineering	Geotechnical Engineering
Transportation Engineering	Construction Engineering
Water Resources	Urban Planning
	Structural Engineering

Civil Engineering: Technical Specialties

I. _____



As a _____ engineer, you will be a builder of our future. The construction phase of a project is the first visible result of a design. Using your technical and management skills, you will turn designs into reality - on time and within budget. You will use your knowledge of construction methods, equipment, and principles of financing, planning, and managing, to turn the designs of other engineers into successful facilities.

II. _____



The skills of _____ engineers are very important as we try to protect the limited resources of our planet. _____ engineers should understand physical, chemical, and biological processes to destroy toxic substances, remove pollutants from water, reduce non-hazardous solid waste volumes, eliminate contaminants from the air, and develop groundwater supplies. In this field, you may have to resolve problems of providing safe drinking water, cleaning up sites contaminated with hazardous materials, cleaning up and preventing air pollution, treating wastewater, and managing solid wastes.

III. _____



Almost all of the facilities that make up our infrastructure are in, on, or with earth materials, and _____ engineering is the discipline that deals with applications of technology to solve these problems. Examples of facilities in the earth are tunnels, deep foundations, and pipelines. Highway pavements and many buildings are supported on the earth. And earth dams, embankments, and slopes are constructed with the earth. In addition, many soil-like waste materials are located in containment areas. To design these facilities, _____ engineers must understand the principles of mechanics and mathematics and conduct analyses, which require input data to quantify the properties of the earth materials, and they can receive this information from laboratory or field tests.

IV. _____



As a _____ engineer, you will have to analyze and design structures to ensure that they are safe. They must support their own weight and resist dynamic environmental loads such as hurricanes, earthquakes, blizzards, and floods. Stadiums, arenas, skyscrapers, offshore oil structures, space platforms, amusement park rides, bridges, office buildings, and homes are a few of the many types of projects that _____ engineers work on. You will develop and use knowledge of the properties and behaviors of steel, concrete, aluminum, timber, and plastic as well as new and exotic materials. To control the project you will have to be on the construction site inspecting and verifying the work.

V. _____



Because the quality of a community is directly related to the quality of its _____ system, your function as a _____ engineer will be to move people, goods, and materials safely and

efficiently. Your challenge will be to find ways to meet the increasing travel needs on land, air and sea. You will design, construct, and maintain all types of facilities, including highways, railroads, airfields, and ports. An important part of _____ engineering is to upgrade our transportation capability by improving traffic control and mass transit systems, and by introducing high-speed trains and other new transportation methods.

VI. _____



As a professional in this area, you will deal with the full development of a community. Analyzing a variety of information will help you coordinate projects, such as projecting street patterns, identifying park and recreation areas, and determining areas for industrial and residential growth. To ensure ready access to your community, coordination with other authorities may be necessary to integrate freeways, airports, and other related facilities. To coordinate the project successfully you will have to be people-oriented as well as technically knowledgeable.

VII. _____



As a _____ engineer, you will deal with issues such as the quality and quantity of water, which is essential to our lives. You will work to prevent floods, to supply water for cities, industry and irrigation, to treat wastewater, to protect beaches, or to manage and redirect rivers. You might work on the design, construction, or maintenance of hydroelectric power facilities, canals, dams, pipelines, pumping stations, locks, or seaport facilities.

2. What key words helped you identify the specialities? Write out two or three words from each paragraph that you need to translate to get better understanding of the text. You may consult a dictionary or ask your teacher.

Activity 2
Pronunciation

1. Match the words in the left and right columns which contain the same sound:

1. structure	a. turn
2. concrete	b. verify
3. analyze	c. pavement
4. containment	d. dam
5. project* (verb)	e. solid
6. determine	f. develop
7. analysis	g. industrial

* 'project - noun
pro'ject - verb

2. Put the words below in the correct column of the table according to their word stress:

require, non-hazardous, analysis, properties, access, pipelines,
coordinate, **maintenance**, substances, **supplies**, project, eliminate,
technology, off-shore, identify, conduct, contaminants, quantify, canal

● ● ●	● ●	● ● ● ●	● ●
		analysis	

Activity 3 Vocabulary
--

1. Look through the descriptions of the specialities again and find English equivalents of the following Russian words and expressions:

I.	Воплотить проект в жизнь
	Этап строительства
	Технические навыки и навыки управления
II.	Разрушать токсичные вещества
	Разрабатывать грунтовое водоснабжение
	Сократить количество невредных твердых отходов
	Удалить загрязнители из воздуха
	Очищать сточные воды
	Перерабатывать твердые отходы
III.	Определить свойства
	Полевые испытания на месте
	Нуждаться в исходных данных

	Дорожное покрытие автострад
	Земельные материалы
	Место скопления (расположения) отходов
IV.	Выдерживать нагрузки окружающей среды
	Осматривать и проверять работу
	Морское нефтяное сооружение
V.	Улучшать провозную способность
	Быть непосредственно связанным с чем-либо
	Сложная задача, проблема, вызов
	Удобства, услуги, оборудование, сооружения
VI.	Гарантировать быстрый доступ к жилым районам
	Проектировать схемы улиц
	Определять участки для промышленной и жилой застройки
VII.	Эксплуатация

2. Find synonyms to the following words in extract II:

pollutant (3) –

to destroy –

to clean (water) (2) –

to supply –

3. What weather words can you find in extract IV? What other words describing weather do you know?

4. Write down all the types of building materials from extract IV. What other building materials do you know?

5. Think of as many derivatives of the given words as you can and complete the table:

NOUN	VERB	ADJECTIVE/ PARTICIPLE II
hazards		
	contaminate	
technology,	--//--	
	construct	
		structural
	apply	
pollutant,		
		transportable
		analyzed
	maintain	

**Activity 4
Grammar**

Very often infinitives are used to express purpose. In this case they answer the question *Why*.

Example: *Construction engineers use their knowledge to turn the designs into successful facilities.*

1. In the texts describing civil engineering specialities there are several examples of the infinitives used to express purpose. Find at least 10 of them.

2. Match parts of the sentences from the left and the right columns.

1. A water resources engineer deals with such issues as the quality and quantity of water...	a. ... to solve problems.
2. Transportation engineers design, construct and maintain all types of facilities, including highways, railroads, airfields and ports...	b. ... to identify the strengths and weaknesses of alternative solutions and conclusions.

3. Civil engineers need to study mathematics...	c. ... to identify engineering problems and assess the potential impact of projects.
4. Civil engineers use logic and reasoning...	d. ... to move people, goods and materials safely and efficiently.
5. One of civil engineers' specific tasks is to conduct studies of traffic patterns or environmental conditions....	e. ... to prevent floods and supply water for cities, industry and irrigation.

3. Transform the sentences using the infinitive of purpose.

Example:

Civil engineers have to make technical plans, blueprints, drawings and models. For this purpose they should possess good knowledge of design techniques and tools.

*Civil engineers should possess good knowledge of design techniques and tools **to make** technical plans, blueprints, drawings and models.*

1. Engineers have to use computers because they need to program and process information.
2. One of the tasks of civil engineers is to choose the best solutions to the problems. That's why they need to analyze information.
3. Civil engineers create economical and aesthetically pleasing facilities. That's why they must be well informed about the sciences and must apply their theoretical knowledge.
4. Geotechnical engineers work closely with environmental specialists because they investigate water contamination and design domestic and mine waste storage facilities.

5. Structural engineers have to be on the construction site inspecting and verifying the work. It is necessary for them as they need to control the project according to the plan.
6. Civil engineers need to use design software and drawing tools. It's important when they plan and design transportation or hydraulic systems and structures.
7. Civil engineers should test soil and materials. It is essential as they need to determine the strength of foundations, concrete, asphalt, or steel.

Activity 5 Summarizing

1. Read the texts on the specialities once again and complete the following table:

Speciality	Tasks and activities	Knowledge and skills	Projects (facilities)
I. Environmental Engineering	To destroy toxic substances, to remove pollutants from water, to reduce non-hazardous solid waste volumes, to eliminate contaminants from the air, to develop groundwater supplies...	Physical, chemical, and biological processes	
II. Construction Engineering			
III. Geotechnical Engineering			
IV. Structural Engineering			

V. Transportation Engineering			
VI. Urban Planning			
VII. Water Resources			

2. Compare your table with the other students' ones in the group.

Activity 6 Writing

Within the framework of specialist program at your university you can further select a subject field (technical speciality) leading to certain specialist qualifications. For example, Nizhny Novgorod State University of Architecture and Civil Engineering (www.nngasu.ru) provides the following specialist qualifications:

- Construction of Roads and Airfields
- Industrial and Civil Construction
- Hydraulic Engineering
- Production of Building Materials, Products and Structures
- Water Supply and Sanitation
- Heat and Gas Supply, and Ventilation
- Expertise and Management of Real Estate
- Urban Construction and Economy



1. What qualification would you like to choose? Make up a table for your qualification like the one in activity 5:

Speciality	Tasks and activities	Knowledge and skills	Projects (facilities)

2. Using the table write a description of your speciality like in Activity 1.

**Activity 7
Speaking**

1. In the past few years the scope of civil engineering has grown to include several new areas of study. What do you think these areas are?

Search the Internet for the keywords *emerging areas in civil engineering* to see the new civil engineering specialities.

Choose one of the new areas to study and prepare a short presentation for your group. Speak about:

Tasks

Challenges

Job responsibilities

Etc.

2. What new areas in Civil Engineering will be more perspective in Russia in future? Why? What area would you like to work in?

Project work

Scenario: Your University is planning to update the web page of Civil Engineering Faculty including information on engineering specialities.

Work in small groups to discuss the contents and design of the web page of a civil engineering specialty and produce a paper version of it.

Subject Areas: different specializations within civil engineering.

Your Investigation: A competition has been announced among the students of Civil Engineering Faculty for the best web page devoted to different civil engineering specialities. Take part in the competition: you are going to write the description of your speciality.

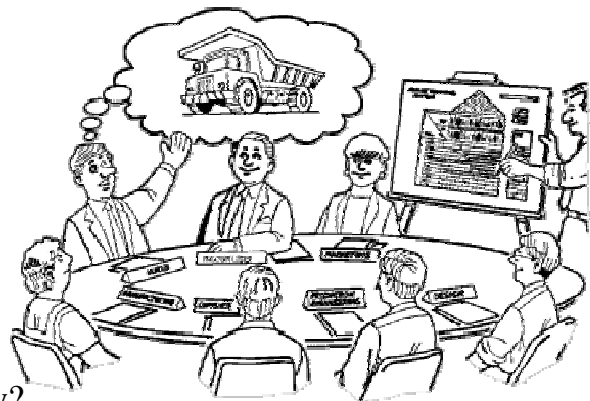
Web site address to search:

Go to this page and then click on the part that refers to your specialization.

http://en.wikipedia.org/wiki/Civil_engineering

Guided Questions on the contents:

1. How would you define your discipline?
2. What is the main subject of the area?
3. What do engineers in this area do?
4. What knowledge and skills do engineers of the specialty need?
5. What are the applications of the specialty?



Guided Questions on the design:

1. How should the information be presented/ organized on the page to make it functional and attractive?
2. What visuals should be placed there?
3. What links should the page contain?

Web site address to search:

<http://www.ce.berkeley.edu/>

<http://www.manchester.ac.uk/study/undergraduate/courses/2016/03343/civil-engineering-3-years-beng/>

Present your projects, hold a competition to choose the best project and award the prize to the winners.

Module 2

Employment

“Choose a job you love and you will never have to work a day in your life”

Confucius (551-479 BC), Chinese philosopher

In this module you will

listen, read and talk about:

- employment of civil engineers, construction equipment
- job requirements, job interviews
- women in construction

learn how to:

- use fractions and percentages
- describe trends
- write CV, memos, letters of applications
- write definitions

practise:

- passive voice
- direct and indirect questions
- pronunciation of topical vocabulary

Unit 4



Unit 5

Unit 6



Unit 4

Statistics



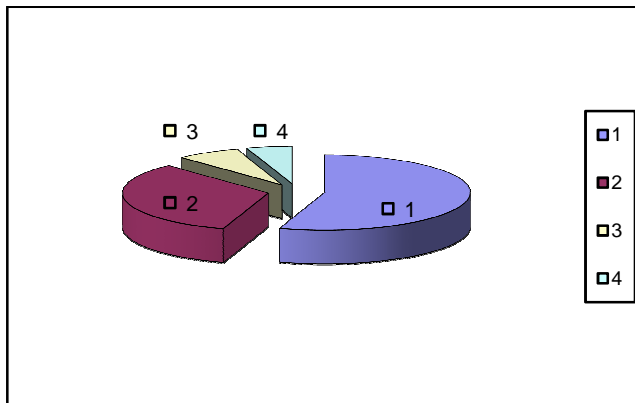
Lead in

What kind of companies do civil engineers work for? What kind of jobs do civil engineers have?

Activity 1

Read the statistical data of the U.S.A. and complete the diagram.

Civil engineers held about 272,900 jobs in 2012. They generally work indoors in offices. However, they sometimes spend time outdoors at construction sites so they can monitor operations or solve problems at the site. Occasionally, civil engineers travel abroad to work on large engineering projects in other countries. *Almost one third* of the job were in Federal, State, and local government agencies. *A little more than half* were employed by firms providing engineering consulting services, primarily developing designs for new construction projects. *Most of the others* worked in the construction and manufacturing industries. *About 12,000* civil engineers were self-employed, many as consultants.



1. .
- 2.
- 3.
4. *Self-employed*

Activity 2
Fractions and percentages

Fractions and percentages are used to express the relative values of one amount compared to another.

- Most fractions expressed using ordinal numbers:

a third ($1/3$) *a fifth* ($1/5$) *two sixths* ($2/6$)

- There are some exceptions:

a half ($1/2$) *a quarter* ($1/4$) *three quarters* ($3/4$) *three and a half* ($3\frac{1}{2}$)

Complete the table:

$1/2$	a half	50%
$1/3$		66%
$1/4$		25%
$3/4$		75%
$1/5$		40%
$5/6$	five sixths	83%
$1/10$		90%

The following words are used to give approximations while talking about amounts.

about approximately nearly roughly around
little less little more

Example: *Approximately a third of civil engineers work in Federal, State, and local government agencies.*

Activity 3
Statistics

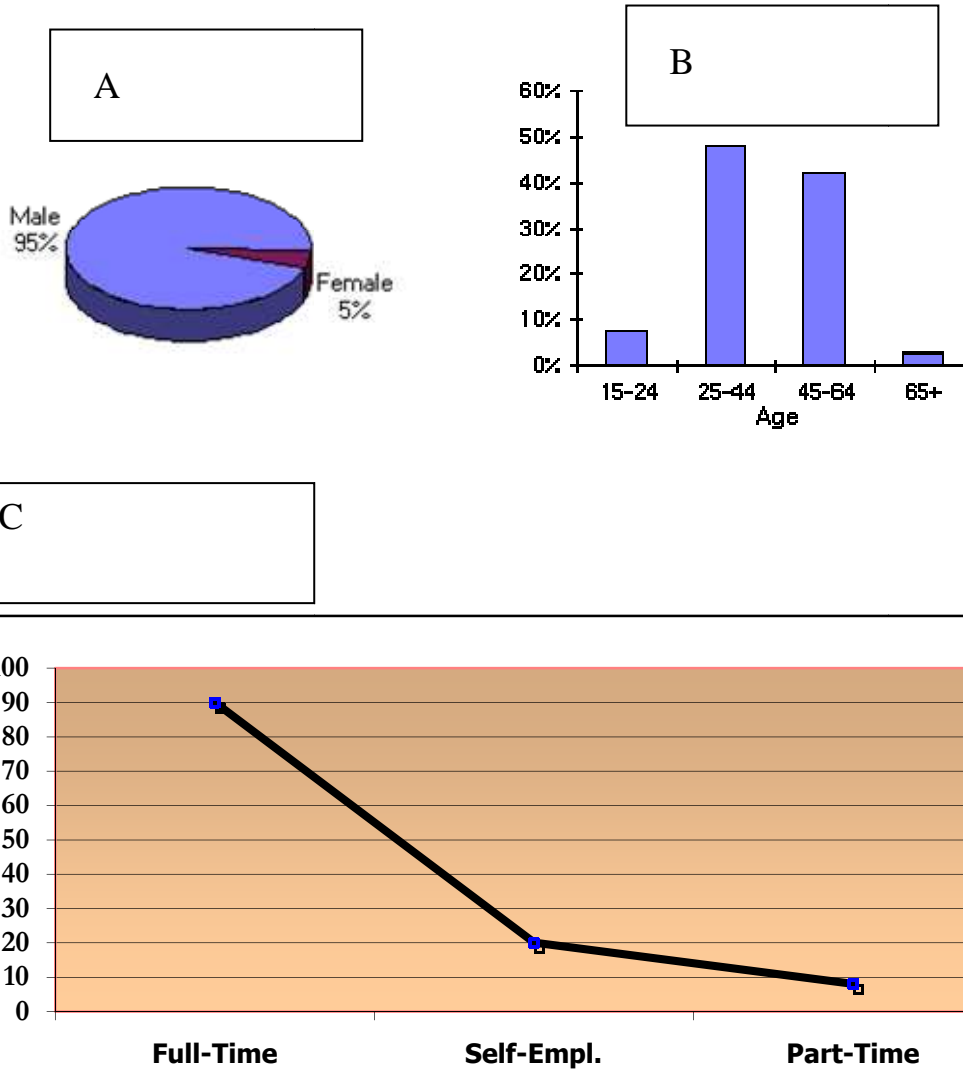
1. Look at the statistics on civil engineer occupations available from Statistics Canada.

Which one is:

- a bar graph
- a line-graph
- a pie chart

2. Match these headings to the correct graph, table or chart.

1. Type of employment of Civil Engineers, 2012
2. Gender of Civil Engineers, 2012
3. Age of Civil Engineers, 2012



3. Look at the information in the bar graph Age of Civil Engineers, 2012 and complete its description. Use the appropriate fractions or percentages and approximation words.

The age chart gives the percentage of people in each of the four age groups: 15-24, 25-44, 45-64, and 65+. **Little less than** **10 %** of civil engineers in 2012 were 15-24 years old. The age of _____ of employees varied from 25 to 44 years old. The group of 45-64 year olds amounted to _____

_____. People of 65 years old and older represented _____
_____.

4. Write down all the verbs used in the text to describe the diagram.

5. Write similar description of the following diagrams: Type of employment of Civil Engineers, Gender of Civil Engineers, 2012. Use words of approximation, fractions and percentages and the necessary verbs to describe the diagram.

Activity 4

1. Do you know how much Civil Engineers earn?

Read the information given by the U.S. Department of Labor.

Median annual earnings of civil engineers were \$87,130 in 2014. The middle 50 percent earned between \$75,150 and \$99,470. The lowest 10% earned less than 57,430 and the highest 10 percent earned more than \$128,110.

According to a 2014 salary survey by the National Association of Colleges and employers, bachelor's degree candidates in civil engineering received starting offers \$50,616 per year, master's degree candidates received an average offer of \$54,080 and Ph.D. candidates were offered \$72,280 as an initial salary.

2. Work in pairs. Present the information given in the text in a diagrammatic form. Prepare 2 variants of the same diagram: the first diagram is a complete version, the second - with only one part filled. Exchange your diagrams with your partners and fill in the missing words (see the text about Employment Statistics of the U.S.A. as an example).

3. Do you know the average salary of a civil engineer in Russia? How much do you hope to earn?

Do you know?



The **United States Department of Labor** is a department of the United States government responsible for occupational safety, wage and hour standards, unemployment insurance benefits, re-employment services, and some economic statistics. The department is headed by the United States Secretary of Labor.

Is there a department responsible for occupational issues in our government?

**Activity 5
Pronunciation**

Put the words from the box in the correct column according to the pronunciation of the letters in bold.

Occupation, satisfaction, large , repair, transportation, capacity, approximately, interact, expanding, replace, manufacturing, global, quality, earnings, major, varied , training, career, postgraduate, area , demand, software, department, salary						
as in place	as in traffic	as in part	as in aerial	as in ability	as in earthquake	as in quantity
	interact					

**Activity 6
Reading**

Do you think employment of civil engineers will increase in the nearest future? Why? Why not?



1. Look through the text about the future of civil engineering, based on the information given by U.S. Bureau of Labor Statistics and answer the questions (Don't worry about the gaps).

- Why will the demand in civil engineers increase?
- How will job requirements for civil engineers change in the future?

2. Before reading the text match English words to their Russian equivalents.

waste treatment plant	дорожное полотно
renewable energy	водоочистная станция
permit documents	крупномасштабный проект
large-scale project	возобновляемый источник энергии
solar panel	грузовик
road bed	разрешительная документация
truck	солнечная батарея

Employment of civil engineers is projected to grow 20 percent from 2012 to 2022, faster than the average for all occupations. As infrastructure continues to age, civil engineers will be needed to manage projects to rebuild bridges, _____, and upgrade dams.

Moreover, a growing population means that new water systems will be required while the aging, existing water systems must be maintained to reduce or eliminate _____. In addition, more waste treatment plants will be needed to help clean the nation's waterways. Civil engineers play a key part in all of this work.

The work of civil engineers will be needed for renewable energy projects. Civil engineers prepare the permit documents for these types of projects, verifying that the project will comply with federal, state, and _____. With regard to solar energy, these engineers conduct _____ for large-scale projects. They also evaluate the ability of solar panel support structures and buildings to tolerate stresses from wind, seismic activity, and other sources. For large-scale wind

projects, civil engineers often prepare road beds to handle large trucks that carry the turbines.

Technology has had a major influence on _____ and training requirements for civil engineers in the last five to ten years, particularly in the areas of computer design programs and software. Many tasks are computer based now and computerization of civil engineering is expected to continue growing.

A higher standard and level of education will be required due to the competitive nature of the job. Civil engineering firms will employ people who have done well in their studies and have completed _____ at a postgraduate level.

Whatever area you choose, design, construction, research, teaching, or management, civil engineering will offer you_____.

3. Which words do you think are missing? Read the text carefully and complete it with the words from the box. Use a dictionary to help you.

a. a wide range of career choices	e. repair roads
b. the skills	f. extra studies
c. leaks of drinking water	g. structural analyses
d. local requirements	

4. Complete this table with the words from the text.

<i>noun</i>	<i>verb</i>	<i>adjective / participle</i>
	to grow	
computerization		
		constructive
reduction		
competition		
	to require	
		employed

Activity 7
Language
review
Passive voice

We often prefer Passive voice when it is not so important who or what did the action.

This house was built in 1800.

This is a passive sentence.



Compare: Somebody built this house in 1800. (active)

This house was built in 1800. (passive)

In this example, it is not important who built the house.

1. Find passive forms in the text about the future of civil engineering.
2. Transform the sentences, using Passive Voice. Example:

Steel provides the strength of structure.

The strength is provided by steel.

- 1) John Smeaton designed and built the famous Eddystone Lighthouse, off the coast of Cornwall, England.
- 2) Civil engineers differentiate the word “construction” from the word “building”.
- 3) Sebastien le Prestre de Vauban laid the foundations of civil engineering profession.
- 4) Builders widely use the chief materials of civil engineering: steel, reinforced concrete and timber.
- 5) A professional civil engineer usually adds several years of practical training and experience to the theoretical basis.
- 6) We can divide the profession of civil engineering into 3 broad categories, such as consulting, contracting and municipal engineering.
- 7) Nowadays the new technologies inevitably influence architectural form.
- 8) If you apply to a firm of contractors, professional civil engineers will organize and control both labour and machines.
- 9) The architect must always keep in mind the function of the proposed building.

3. Find all the uses of Passive Voice in the section “Do you know”.

Do you know?



The **Eddystone Lighthouse** is a lighthouse situated on the Eddystone Rocks, 14 miles south-west of Plymouth. There were 4 versions of this structure. The first was an octagonal wooden structure created in 1698. It was destroyed by the Great Storm of 1703. The second lighthouse was designed as a conical wooden structure and destroyed by fire in 1755. The third lighthouse (1756-1759), known as *Smeaton's Tower*, was perhaps the best known as for its structure John Smeaton developed 'hydraulic lime' (a form of concrete) and thus advanced cement technology. It was dismantled because of the rock erosion and later rebuilt at Plymouth in 1877 as a memorial. The current, fourth lighthouse was built in 1882. The techniques used in its construction were pioneered by Robert Stevenson. The tower is 51m high.

Which version of the light house do you think is shown in the picture above?

4. **Passive Voice is widely used to describe landmarks and other constructions. Have you ever heard about *The Grand Canyon Skywalk*? Where is it located? How high is it? Read the introduction to the text about *The Grand Canyon Skywalk* and check yourself.**
5. **Read the rest of the text and put the verbs in brackets into the correct form (Active or Passive).**

The Grand Canyon Skywalk (in Arizona, USA) is a horseshoe-shaped, glass-bottom structure that allows visitors to walk 70 feet past the edge of the Grand Canyon wall and stand 4,000 feet above the Colorado River.

The Grand Canyon Skywalk is active and open to the public year-round, hosting approximately 2 million visitors.



The Grand Canyon Skywalk (to open) to the general public on March 28, 2007. It (to access) via the Grand Canyon West Airport terminal or a 120-mile (190 km) drive from Las Vegas.

David Jin, an entrepreneur who (to involve) with tourism and the Hualapai Nation for some time, (to have) the idea of extending a platform out over the edge of the Grand Canyon. With the help of architect Mark Ross Johnson, that idea (to evolve) into a "U"-shaped walkway that (to construct).

The overall Skywalk width is 65 feet (20 m), the length is 70 feet (21 m). The outer and inner bridge box beams (to support) by eight box posts.

The deck of the Skywalk (to make) with four layers of iron glass. The Skywalk glass sidings (to make) with the same glass as the deck. Engineers (to conduct) extensive testing during the planning and design phase to ensure the Grand Canyon Skywalk could easily withstand the high winds that (to blow) through the Grand Canyon.

The walkway could carry 822 people that weigh 200 pounds (91 kg) each without overstress, but maximum occupancy at one time is 120 people.

The Skywalk (to assemble) on top of the canyon wall and moved into final position in two days.

Astronauts Buzz Aldrin and John Herrington (to attend) the opening ceremony on March 20, 2007.

According to Hualapai officials, the cost of the Skywalk (to be) \$30 million. Future plans for the Grand Canyon Skywalk complex (to include) a museum, movie theater, VIP lounge, gift shop, and several restaurants.



6. What other outstanding landmarks do you know?

Now write a description of your favorite landmark, using the passive. Then tell your classmates about it.

Activity 8

1. Discuss these questions about future of civil engineering.

Use the information from activities 1, 3, 4, 5.

- What reasons for the increasing demand in civil engineers do experts give?
- What will civil engineers have to do in future?
- What skills will be necessary for future civil engineers? Why?
- “A higher standard and level of education is now required due to the competitive nature of the job”. What does “competitive nature of the job” mean?

Unit 5

Starting a Career



Lead in

Discuss these questions.

1. Are you ambitious? Why or why not?
2. Do you have a career plan? Where do you want to be in 10 years' time?
3. Which of the following areas would you like to work in? Why?
 - design
 - construction
 - research
 - teaching
 - management

4. How are you going to find a job?

What documents are necessary to have to apply for a job?

Activity 1 CV

1. Study David M. Beekman's CV below and write each heading in the correct space (David is the last year student).
2. What headings can you add?

ADDRESS, PROFESSIONAL OBJECTIVE, EDUCATION, EXPERIENCE, AFFILIATIONS¹, REFERENCE², E-MAIL, TELEPHONE

**CURRICULUM VITAE
DAVID M. BEEKMAN**

I. Address P.O. Box 130 - Pennington, New Jersey 08534-0130

II. _____ (609) 730-0510

III. _____ jccpc@msn.com

IV. _____
Establish a career in **Civil Engineering** design and research allowing me to practice my engineering knowledge for the benefit of the firm and society.

V. _____
OHIO UNIVERSITY, Athens, OH
Bachelor of Science in Civil Engineering
Master of Science in Civil Engineering, expected June 2018

VI. _____
Research Assistant for Dr. T.J. Chang - Present
OHIO UNIVERSITY DEPARTMENT OF CIVIL ENGINEERING

- Conduct studies in water resources management
- Manage laboratory computer systems, software, and web page.

Inspector - Summer Break 2012
PIKE COUNTY ENGINEER'S OFFICE

- Primary inspector for construction site
- Performed occasional routine inspections of construction of a bridge
- Calculate how much the work will cost

Student Intern³ - Summer Break 2011
ENGINEERING DIVISION OF BECHTEL JACOBS COMPANY LLC at the
PORTSMOUTH GASEOUS DIFFUSION PLANT

- Assisted Lead Engineers in designs, calculations, and **AutoCAD** drawings for construction activities.

VII. _____
American Society of Civil Engineers
National Society of Professional Engineers

VIII. _____
Available upon request.

1. Членство
2. Рекомендации
3. Студенческая практика

Do you know?

The **American Society of Civil Engineers** (ASCE) was founded in 1852 to represent members of the civil engineering profession worldwide. It is the oldest national engineering society in the United States. <http://www.asce.org/asce.cfm>

The **National Society of Professional Engineers** (NSPE) is the national society of engineering professionals from all disciplines that promotes the ethical and competent practice of engineering, helps to get licenses. Founded in 1934, NSPE serves more than 54,000 members and the public. www.nspe.org.

What Russian associations of civil engineers do you know?

Activity 2
Job
description

1. David M. Beekman is going to apply for a job as a professional (civil) engineer in the construction company

Leap 33. Below you will find the job description of a professional (civil) engineer. Before reading match English expressions with their Russian equivalents.

1. sewer system	a. наблюдать, контролировать, проверять
2. wharf	b. исследовать; получать сведения
3. investigate	c. подрядчик
4. evaluate	d. замечать детали
5. guideline	e. канализационная система
6. relevant authority	f. директива, руководящее указание
7. tender out	g. гарантировать, обеспечивать
8. monitor/ 9. supervise	h. работать в стрессовых условиях
10. ensure	i. верфь
11. work under pressure	j. компетентный орган
12. contractor	k. оценивать; устанавливать стоимость; определять количество
13. have an eye for detail	l. участвовать в тендере, конкурсе, подавать заявку (на конкурсе, торгах)

1. Now read the job description and find out if David M. Beekman suits the requirements? If not, what does he lack?

PROFESSIONAL (CIVIL) ENGINEER

Introduction

Description

Civil engineers design and supervise the building and repair of things such as buildings, roads, bridges, tunnels, dams, water supply and sewer systems, and wharves. Civil engineers usually specialize in one of these areas.

Tasks and Duties

Civil engineers:

- consult with clients, other professionals and government officials
- study, evaluate and investigate construction and land development sites
- design structures such as roads, drainage and buildings that are required for the site
- work within the guidelines of the local government authority
- get plans approved by relevant authorities
- may prepare cost estimates and contract documents for the work
- tender out the contract and find contractors to do the work
- supervise and monitor construction to ensure the structure is built in accordance with the construction drawings and contract
- ensure construction standards are met
- may attend construction site meetings with the contractor and client.

Personal Requirements

Skills

Civil engineers need to have good organisation and problem-solving skills. They should also have design skills and skill in interpreting construction plans. Excellent communication skills are essential.

Knowledge

Civil engineers need to know about surveying methods, environmental issues and the properties of the materials they are working with. They also need to have a technical knowledge of civil engineering design. Civil engineers need to know building and safety regulations, local authority and government regulations, acceptable standards for construction and how to draw plans. Civil engineers should be computer literate in order to use design and drawing software.

Personal Qualities

Civil engineers must be self-disciplined, safety-conscious, adaptable and practical. They should have an eye for detail and work well under pressure. Civil engineers need to work independently and in a team, communicate well with others, and work with a wide variety of people.

Physical Requirements

There are no physical requirements for civil engineers

Activity 3
Writing

1. As a personnel director of a civil engineering company complete this memo to the general director explaining why you are (you are not) going to recruit David M. Beekman. Use at least 5 phrases from exercises 1, 2.

*Memo*

To: general director
 From: personnel manager
 Date:
 Subject: Appointment:

I recently studied the resume of
 for the position of

I have decided to appoint.....

I will briefly describe the candidate's
 strengths and explain the reasons for the
 decision. ...

If you approve my recommendation, I will
 prepare the contract for signature. Please let
 me know your decision as soon as possible.

Activity 4

1. Combine words from columns A and B to make phrases, then match them with the definitions in column C. (if necessary use the text)

For example: **Building and safety regulation** are principles, rules, or laws designed to control building or safety.

A	B	C
1) construction	<i>a) estimates</i>	A. principles, rules, or laws designed to control building and safety
2) problem-solving	<i>b) materials</i>	B. qualities of materials
3) local government	<i>c) literate person</i>	C. building codes and rules
4) surveying	<i>d) regulations</i>	D. a statement of how much it will probably cost to build or repair something
5) properties of	<i>e) authority</i>	E. methods (planned ways) to examine an area of land in order to make a map of it
6) cost	<i>f) documents</i>	F. a person who is able to use a computer
7) computer	<i>g) standards</i>	G. abilities to find answers to problems or ways of doing things.
8) contract	<i>h) skills</i>	H. a government department that has the power to make decisions and has particular responsibilities
9) building and safety	<i>i) methods</i>	I. official agreements between two or more people, stating what each other will do

2. Have you ever given a definition? Do you know how to do it?

Aristotle suggested that a good definition should include the general classification of a term plus the specific characteristics that differentiate the term from other members of its class.

For example: **Fluid mechanics** is a branch of mechanics that deals with the properties of liquids and gases.

Definition formula Term = Class + Characteristics

There are certain sentence patterns used to give a definition:

Sentence pattern	TERM	=	GENERAL CLASS WORD	+	SPECIFIC CHARACTERISICS
I.	An astronomer		a scientist	who that	studies the universe.
II.	A barometer	is	an instrument	which	measures air pressure.
III.	A laboratory		a place	where	experiments are performed.
IV.	Physics	is	the study		of matter and energy.
V.	Energy		an ability		to do work.
VI.	A volt		a unit		for measuring electrical pressure.

	TERM	=	SPECIFIC CHARACTERISICS	+ GENERAL CLASS WORD
VII.	Asbestos	is	a fire-resistant	mineral.
VIII.	Potential energy		stored	energy.

3. Write down the definitions to the following words and expressions using different sentence patterns:

sewer system, civil engineer, water supply system, contractor, construction plan, software, fluid mechanics , AutoCAD drawing

Activity 5

Imagine that you are a professional civil engineer. Read the following advertisement. Choose the position you would like to apply for. To get more information about each of the positions on offer surf the Internet <http://www.kiwicareers.govt.nz/jbyi/famfrm.htm>. Find the descriptions of the following jobs:

- HEATING, VENTILATION AND AIR-CONDITIONING ENGINEER
- CONSTRUCTION ENGINEER
- ROADING ENGINEER

Company: Leap 33

Job Title:

- HEATING, VENTILATION AND AIR-CONDITIONING ENGINEER
- CONSTRUCTION ENGINEER
- ROADING ENGINEER

Regions: Greater London, South East

Job Type: Permanent

Salary: J33,000 - J40,000 + car allowance + pension + healthcare + 23 days holiday

Background

Leap 33, one of the UK's leading construction companies with a turnover of over £1.5 billion is looking for:

- *HEATING, VENTILATION AND AIR-CONDITIONING ENGINEER*
- *CONSTRUCTION ENGINEER*
- *ROADING ENGINEER*

to work on new build projects based in the London and Middlesex areas. Projects will involve the build and fit out of large hospital schemes ranging in value from £30 million to £60 million. As a large and established main contractor with a variety of divisions and services, the company can offer candidates opportunities for personal development and progression.

2. Make up your CV (resume) and write a letter of application for the chosen position using some of the expressions from the Useful language box.

Useful language

Dear Sir or Madam,
With reference to your advertisement in ...I would like to apply for the position of
I feel I am well qualified for the position because
I would be happy to give you more details and can be contacted at any time.
I would be happy to come for an interview at any time convenient to you.
I enclose a copy of my CV/ A full CV (is) attached.

I look forward to hearing from you.
Yours faithfully,
 ...

- 3. Work in 3 teams. Each group represents managers of the personnel department choosing the most suitable candidate for one of the positions listed in the advertisement. Discuss the strengths and weaknesses of each candidate. Note down reasons for your choice and present it to the other team.**

Activity 6
Grammar review

To behave efficiently at the interview you have to know how to ask and answer questions politely.

1. Match the rules 1-4 with the examples a-d below.

1. If *who/what/which* is the subject of the sentence, we do not use *do/does/did*.
2. Direct questions are usually made by putting an auxiliary verb before the subject.
3. We often use indirect questions to ask for information or to be polite. The word order is different from a direct question. We often begin indirect questions with expressions like *Do you know... Could I ask you... Could you tell me... Would you mind telling me...I'd like to know... etc.*

4. When a verb phrase has no auxiliary verb (I live in Paris), the question is made with the auxiliary *do*: ***Do you live in Paris?***

Examples:

- a). When can you come to the interview?
- b). Do you work in sales?
- c). Who got the job?
- d). Do you mind if I ask you what your weaknesses are?

2. For each direct question below tick the correct indirect question.

- 1). What are your strengths?
 - a). Could you tell me what your strengths are?
 - b). Could you tell me what are your strengths?
- 2). What would your colleagues say about you?
 - a). I'd like to know what would your colleagues say about you.
 - b). I'd like to know what your colleagues would say about you.
- 3). How have you changed in the last five years?
 - a). Could you tell me how you have changed in the last five years?
 - b). Could you tell me how have you changed in the last five years?
- 4). Do you work in the construction industry?
 - a). Could I ask you if do you work in the construction industry?
 - b). Could I ask you if you work in the construction industry?

3. To make a decision on the best person for the job, the company needs to find out about these four areas:

- the skills the candidates have
- their personality
- their experience
- their expectations

a. Look at the questions below. Which of the four areas is each of the questions asking about?

- 1). Do you think you are a natural communicator?
- 2). What did you like most about your last job?
- 3). How do you try to motivate the people that you manage?
- 4). How do you spend your free time?
- 5). What kind of job would you like to have in five years' time?
- 6). Why did you leave your last job?
- 7). What are your weak points?
- 8). How much do you expect to earn?

b. Turn the direct questions into indirect ones.

c. Think of at least one more question to ask about each area.

<p>Activity 7 Role Play</p>

1. Work in pairs:

Pairs A are interviewers.

Pairs B are candidates (interviewees).

Pairs A. Work on the questions that interviewers are supposed to ask and prepare to answer the candidate's questions about the company Leap 33 (See Supplementary Materials). Swap the questions and discuss them together in the class.

Pairs B. Make up a list of questions you are going to ask the interviewers about the company Leap 33 and the job, think of the questions interviewers might ask you, prepare to answer them.

Swap the questions and discuss them together in the class.



2. **Role play the job interview situation. Use your CVs and letters of application.**

3. **When you have finished the interview, complete the following evaluation sheet for the candidate you've interviewed. Would you employ him or her? Why/ Why not? Discuss your reasons with the candidate.**

EVALUATION SHEET	
Position.....	
Name of candidate.....	
	Score
	- +
	1 2 3 4 5
BACKGROUND	
Education:	_____
Languages:	_____
Experience:	_____
BEHAVIOUR AND COMMUNICATIVE ABILITY	
Physical Presentation:	_____
Communicative skills:	_____
Ability to listen:	_____
Humour:	_____
Culture:	_____
Maturity:	_____
Manners:	_____
PERSONAL QUALITIES	
Ambition:	_____
Organisational skills:	_____
Leadership:	_____
Team Spirit:	_____
CONCLUSION	
Suitability of the candidate.....	
.....	
.....	
Action to be taken.....	
.....	
.....	

Activity 8

Discuss with your partner the following questions:

1. When choosing a candidate for a job, which is more important – qualifications or personal qualities?
2. What do you hope to do in the future in your career?
3. Do you think there is an ideal career for you? What is it?
4. What is the best advice you have ever been given about your future career?

Unit 6

On a construction site!



Lead in

Have you ever worked on a construction site? If yes, what did you do? What were your responsibilities? If not, what can students usually do during their practical work on the construction site?

Useful language

I worked as a...	... plasterer/ bricklayer/ (house)painter/ carpenter/ paper- hanger / general worker/ loader, etc.
I dealt with...	... putting (pipes, bricks, windows and doors...) in place
I was involved into...	... digging (trenches, ...)
I was responsible for...	... assembling (wooden frames, ...)

Activity 1

What equipment did you use or see on the construction site?

Look at the photos. Which photo shows...?

- a truck-mounted caterpillar front-end loader
- utility conduits
- drainage piping
- a backhoe
- a power saw
- a hammer
- a construction site
- a truck



2





Activity 2

You are going to read an extract from the novel “The Stars Shine Down” written by the world’s master storyteller Sidney Sheldon.

Lara, the main character of this book, deals with real estate investment. In this extract she is watching her first building being constructed.

1. Before reading match the words to their Russian equivalents:

gridiron	ось
hub	земляные работы
trench	трубопровод, кабелепровод
grading	решетка
utility conduit	котлован, траншея

2. Read the extract and choose the best answer to the following questions (find proofs in the text).

1. What is Lara's occupation?

- a) a builder
- b) a contractor
- c) a building owner
- d) an architect

2. How would you describe Lara's emotional state? Why?

- a) indifferent
- b) excited
- c) bored
- d) enthusiastic



“Watching the new building **going up** was the most exciting thing Lara had ever experienced. She was there every day. “I want to learn”, she told Charles Cohn. “This is just the beginning for me. I’m going **to put up** a hundred buildings.”

Cohn wondered whether Lara really knew what she was **getting into**.

5 The first men **to set foot on** the project site were members of the survey team. They established the legal geometric borders of the property and drove hubs into the ground at each corner, every hub painted with a fluorescent color for easy identification. The survey work was finished in two days, and early the following morning, heavy earthmoving equipment – truck-mounted Caterpillar front-end loader
10 – arrived at the site.

Lara was there, waiting. “What happens now?” she asked Buzz Steele.

“We clear and **grub**.”

Lara looked at him. “What does that mean?”

“The caterpillar is going **to dig up** tree stumps and do some rough grading.”

15 The next piece of equipment that came in was a backhoe to dig the trenches for

its foundations, utility conduits, and drainage piping.

By now the boarders at the house had all heard what was happening, and it became the main topic of conversation at breakfast and supper. They were all cheering for Lara.

20 “What happens next?” they would ask.

She was becoming an expert. “This morning they put the underground piping in place. Tomorrow they start **to put in** the wood and concrete formwork, so they can wire-tie the steel bars into the skeletal gridiron.” She grinned. “Do you understand what I’m saying?”

25 Pouring the concrete was the next step, and when the concrete foundation was cured, large truckloads of lumber **rolled in**, and crews of carpenters began **to assemble** the wooden frames. The noise was horrendous, but to Lara it was music. The place was filled with the sounds of rhythmic hammers and whining power saws. After two weeks the wall panels, punctuated with window and door openings, were
30 stood upright as if the building had suddenly been inflated.

To passerby, the building was a maze of wood and steel, but to Lara it was something else. It was her dream come to life. Every morning and every evening she went downtown and stared at what was being built. I own this, Lara thought. This belongs to me.

3. Explain the words in bold.

4. Now find the appropriate word or expression in the extract corresponding to following phrases. Translate the found expression into Russian.

1. A group of people who have been chosen to work together to measure and record the details of an area of land (lines 1-5).
2. All the special tools, machines etc that you need for grading (lines 5-10).
3. A system of pipes used to carry waste water away from buildings (lines 15-20).
4. To fasten two or more things together and hold them in a particular position using wire (20-25).
5. Reinforcement/ armature rods (metal sticks) (lines 20-25).

5. a) Complete these words by adding the vowels:

Do you know?

1. C_t_rp_ll_r
2. B_ckh_ _
3. Gr_d_r_n
4. Tr_ckl_ _d
5. L_mb_r*
6. H_mm_r
7. S_w
8. C_nd_ _t
9. Pl_mb_r
10. T_mb_r**

* пиломатериал; заготавливать лесной материал

** строевой лес, лесоматериал, пиломатериал;
строить из лесных материалов, плотничать

WORKING CONDITIONS

Plumbers may have to work indoors or outdoors on a ladder or scaffold, underground in a trench, a crawlspace under a building, or in the unfinished basement of a new building. Some of the work is dirty and messy in dusty or muddy conditions. The work is active and strenuous, with standing, bending, crawling, lifting, pulling, and pushing, and is often done in strict accordance with the state plumbing and mechanical code regulations.

TYPES OF CONDUITS

There are many types of materials used for making conduits, including aluminum, clay and concrete. The type of conduit you use will depend on the type of material or substance you need to house. Although conduits can be devised of various materials, more and more they are being made of plastic. Plastic conduits are lighter, less expensive and easier to use. Still, when you need to ensure protection from electrical interference, metallic conduit is probably best.

b) Now complete the following sentences using some of the words above:

1. _____ are skilled craftsmen who install, repair, and alter pipe systems which carry gases, water and other liquids required for sanitation, industrial production, and other uses.
2. A _____ is used to let something pass, be it liquid, gas or wiring.
3. On a construction site it is necessary to use different _____ construction vehicles, including the track - type tractor, excavator, and others.
4. Galvanized (оцинкованный) steel _____ are used for transporting water, gas and other liquid.

5. _____ is used for driving nails (гвозди), beating metals, and the like, consisting of a head, usually of steel or iron, fixed crosswise to a handle.
6. An instrument for cutting or dividing substances, as wood, iron, etc., consisting of a thin blade, or plate, of steel, with a series of sharp teeth on the edge, which remove successive portions of the material by cutting and tearing - _____.

Activity 3
Pronunciation

Put the words below in the correct column of the table according to their word stress:

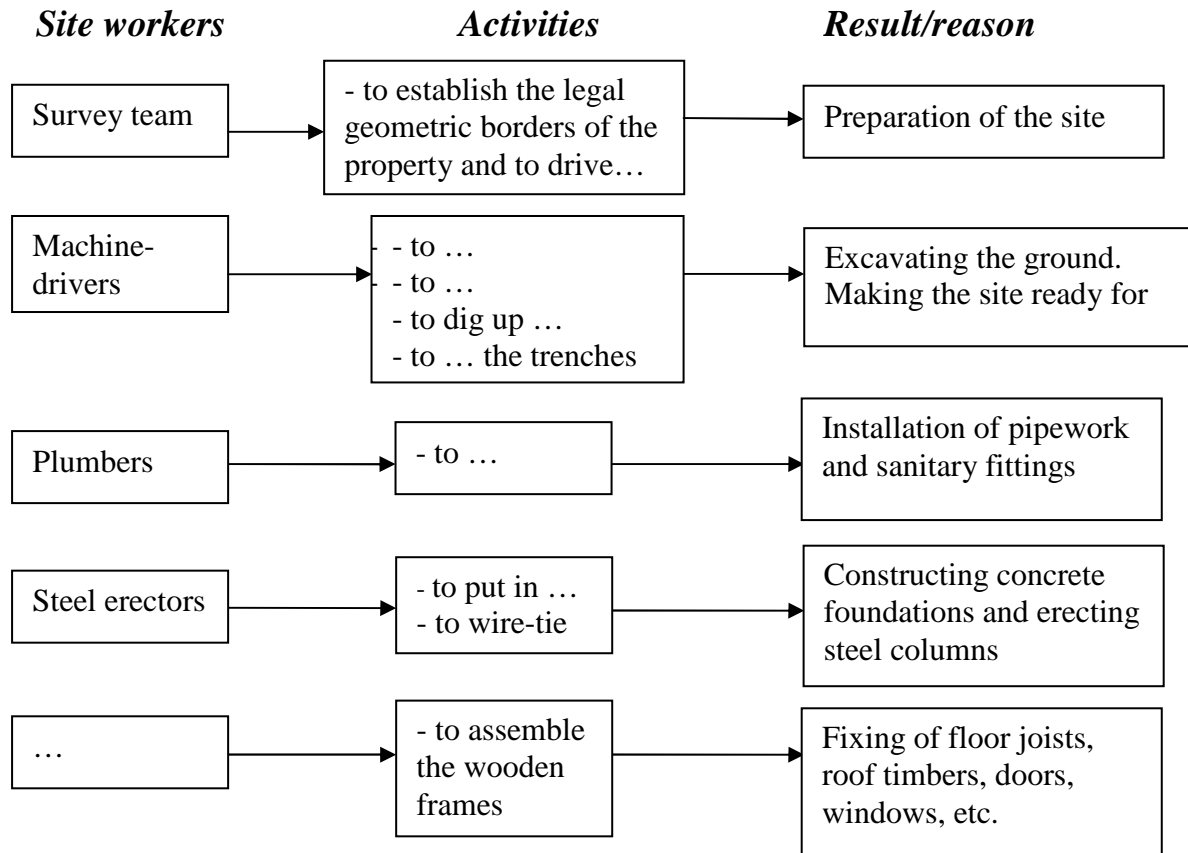
Drainage, utility, conduit, backhoe, hammer, truckload, caterpillar, loader, construction, contractor, gridiron, assemble, equipment, survey, excavate, sanitary, erect, wire-tie.

1	2	3	4	5	6
•●...	●...	●...	•●.	•●	●.
					drainage



Activity 4

1. Read the extract again and complete this flow diagram:



2. Compare your diagrams in pairs.

Activity 5

Discuss the following questions.

1. In the extract from the “The Stars Shine Down” the author describes the process of building a house in the USA in 1980s.

Is this description similar to the process of construction in Russia nowadays?

Do we use the same equipment? Is the sequence of construction stages the same or different? In what way?

How long does it take to put up a building?

2. Have you ever watched a building being constructed?

Lara is very enthusiastic to be involved in the construction activities: “Every morning and every evening she went downtown and stared at what was being built. I

own this, Lara thought. This belongs to me.” Do you agree that the process of turning design into reality is really exciting? Why?

**Activity 6
Women in
Construction**

1. Are certain careers more suitable for women than for men? Look at

the list of jobs below. Which do you consider

a) for women only?

b) for men only?

c) for either?



- | | |
|---|--|
| <ul style="list-style-type: none"> • brickie (bricklayer) • personal assistant (PA) • design engineer • foreman • quantity surveyor • ventilation engineer • manager • administrative assistant | <ul style="list-style-type: none"> • teacher • chief engineer • chief executive • land-surveyor • city planner • plasterer • receptionist |
|---|--|

2. Include other careers.

**Activity 7
Reading**

**1. Discuss the questions:
Why do women choose a career in Civil Engineering? What advantages and disadvantages does the construction industry offer women?**

2. You are going to read the article “Build a great career” by Susan Pape. Look through the introduction to it and answer the question: What jobs in construction are women good at?

Build a great career!

PAs in the construction industry may find it a bit rough and ready sometimes, but it's also highly rewarding, says Susan Pape.

It's rough, it's tough and it's no place for a woman. Or that's the traditional view of the building industry – populated, as we all suppose, by large men. But is the stereotypical image a realistic one?

Construction is one of the largest industries in the UK, worth some £ 60 billion and employing just over million people. But women account for just 9 per cent of the workforce – with the majority of those working in secretarial positions – and that is a position the industry is looking to improve.

The Construction Industry Training Board (CITB) is running a campaign to attract more young women into the industry by highlighting the various careers available. And building companies are now echoing the call. Jeff Fryer, managing director of construction company M&M Plasline, based at Bishop Auckland, believes that the industry is working to raise its professional profile, reputation and standards, and that more women will want to join. "The industry is not seen as particularly attractive to females. But in my view, women have a lot to offer," he says.

"They are very good at organization and structure – and while not all of them might want to become plasterers and brickies, there are jobs at the coal face that they would be very good at, particularly in administration and management."

3. Work in groups of three. Make notes in the chart below about your extract.

Student A: Read Extract I.

Student B: Read Extract II.

Student C: Read Extract III.

	I	II	III
Name			
Job responsibilities			
What she likes about her job			
What she dislikes about her job			

I

Melanie Box says the work is interesting, varied – and fun. She is an admin assistant in the plastering division at M&M Plasline. “Most of my time is spent on admin, typing and filing.”

She deals with site constructors but tries to keep them at her door. “Otherwise they come in and leave dust everywhere,” she says. “They are supposed to put plastic overshoes on because their feet are filthy.”



She also has a swear box in the office and charges 20p for every inadvertent slip. “The lads are so used to working in groups outside that they forget to mind their language.”

II

Sue Hubbard’s office is a temporary building on the site where the multi-million pound Braunstone Leisure Center is being built in Leicester.

She is a receptionist for Willmont Dixon, the construction firm. “I see a lot of the builders,” she says. “They come into the office – and they are very friendly. Some forget themselves and swear but I can take it.”

Sue's job involves answering phones, sending faxes, sorting the mail and dealing with visitors. "The office is right on the edge of the building site so there's always a lot going on – and a lot of noise in the background," she says. "I come to work in normal office clothes because I don't have to go on site that often. And I'm not that keen. I haven't got a head for heights so there is no way I'm going up one of their ladders."



III

PA Katie Maltby can't wait to go on site visits and keeps her safety boots, high visibility jacket and helmet at the ready. Much of Katie's role involves dealing with suppliers, and joinery and plumbing sub contractors.

"I love going out on site, especially when we're fitting out a store from scratch, because you get to see the job from start to finish, which is very rewarding," she says.



It means she is on first name terms with many of the builders, joiners, electricians and plumbers she works with. "They are a great bunch," she says. "I was worried at first because I had the usual image of a builder – and while they are very down to earth they do try to watch their language and behave when I'm about. They're actually nice people and great fun."

For details of careers in construction, contact the CITB website: www.bconstructive.co.uk

4. Give your partners an oral summary of tour extract using your notes from the table.

5. Work with your partners and decide which of these statements are true or false?

1. Construction is one of the smallest industries in the UK.
2. Women have very good organizational and managerial skills.
3. All the women (in the article) like going out on site.
4. Melanie Box spends all her time typing and filing.
5. Sue Hubbard doesn't mind when builders sometimes swear.
6. Katie's opinion of builders has changed while working with them.

6. Find words or phrases in the article which mean:

- a. making you feel happy and satisfied because you feel you are doing something useful or important, even if you don't earn much money (Introduction, para 1)
- b. difficult to do or deal with (year, race, decision, question, time) (Introduction, para 2)
- c. to make up a particular amount or part of something (Introduction, para 3)
- d. all the people who work in a particular industry or company (Introduction, para 3)
- e. a short description that gives important details about a person and his profession status (Introduction, para 4)
- f. consisting of things of different types, sizes, or qualities (Text 1, para 1)
- g. to include something as a necessary part (Text 2, para 3)
- h. not interested in or attracted by someone or something (Text 2, para 3)
- i. (builders') clothes that are easy to see (Text 3, para 1)
- j. a strong hard hat that soldiers, motorcycle riders, the police or builders wear to protect their heads (Text 3, para 1)
- k. to be materially-minded (Text 3, para 3)

7. Discuss the questions.

1. If you are a girl, where would you prefer to work: on the construction site or in the office? Why? What job would you like to do?

2. If you are a boy, do you think it is a good idea for a girl to work on the construction site? Why? / Why not?

Project Work

Work in small groups. Find the latest statistical data about construction industry in Russia:

- Age of civil engineers
- Gender of civil engineers
- Salary in construction
- ...

Present your findings in the form of diagrams.

Make a presentation of your findings. Listen to presentations of other groups and compare the statistics.



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Учебное пособие

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