ДОНСКОЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

УПРАВЛЕНИЕ ДИСТАНЦИОННОГО ОБУЧЕНИЯ И ПОВЫШЕНИЯ КВАЛИФИКАЦИИ

Кафедра «Иностранных языков»

Методические указания

по профессионально-ориентированному чтению текстов по дисциплине

«Английский язык»

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Аннотация

Методические указания по профессионально-ориентированному чтению предназначены для бакалавров 1 курса Дорожно-транспортного факультета.

Методические указания состоят из двух логически взаимосвязанных разделов (Unit 1 и Unit 2), где первый раздел посвящён изучению строительных материалов, второй раздел – строительству дорог и аэродромов.

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Оглавление

UNIT I.

Part 1.
Construction Materials

1. New words and expressions to be learnt.

- purpose – цель
- durable – прочный
- resistance – сопротивление
- ferrous – соединения закиси железа
- strength – прочность, сила
- timber – строевой лес, брёвна
- advantage – преимущество
- artificial – искусственный
- ferrous – соединения закиси железа

2. Read the text and entitle it.

Construction Materials

Materials, used for construction purpose possess different properties. Wood, timber, brick, stone, concrete, metals, and plastics belong to the most popular building materials used nowadays. They all have their advantages and disadvantages.

Wood belongs to naturally grown materials. It is known to be the oldest construction material and is still widely used. But its usage is limited because of its disadvantage: it easily burns and decays. As to stone, it also belongs to the oldest building materials. Among its advantages there are strength, high heat insulation and fire resistance.

Brick belongs to artificial construction materials. It has been used in many countries and in different climates. In modern times bricks vary widely with the method of production and temperature of burning.

Concrete is known to be one of the most popular building materials. The main property is that it can be formed into strong monolithic slabs. Concrete is known to be fire and decay resistant.It is produced by mixing cement, gravel, water, and sand in the proper amounts.Metals belong to hard and fire – resistant building materials. Non-ferrous are metals whose main components is not iron. As to iron, steel and their alloys, they belong to the group of ferrous metals.

3. Answer the questions:

1. Into what groups can construction materials be divided?
2. What are the advantages (disadvantages) of wood, stone, metals?
3. How concrete is produced?
4. What two groups are metals divided into?
5. What is the difference between ferrous and non-ferrous metals?

4. Match the English equivalents to their Russian ones:

1. to possess different properties	a) теплоизоляция
2. to differ in	b) принадлежать
3. fire resistance	c) недостаток
4. heat insulation	d) принимать во внимание, рассматривать
5. disadvantage	e) обладать различными свойствами
6. to belong to	f) различаться
7. to take into account	g) гнить, затухать
8. to decay	h) огнеупорность
9. artificial	i) варьироваться, меняться
10.to vary	j) искусственный

5. Complete the following sentences:

1. Materials used for construction purpose possess...
2. Wood, timber, brick, stone, concrete, metals and plastics….
3. They all have their ….and …that are taking into account when designing a structure.
4. Wood…naturally growing materials.
5. Wood is popular since it has …and….
6. But its usage is limited because of its disadvantages: it easily….
7. Brick belongs to …construction materials.

6. Make up a plan and retell the text according to it.

Part 2.
Timber

Timber is wood for building and structural purposes. It belongs to one of the oldest building materials. Timber is supplied either rough or finished.Timber has always been highly usable in construction because of its many advantages, like strength, light weight, cheapness and high workability. It can be used for many construction purposes. But, naturally timber has disadvantages and the main ones are that it is not fire resistant and it easily decays.

Freshly cut timber contains water that may cause great structural defects. Removal of water from timber is a necessary procedure. Because of its many advantages it is highly used for producing windows and floor frames, for flooring and roofing and for other various wood works.

The two main types of timber are hardwoods and softwoods. Hardwoods are popular as materials used for decorative purposes: veneering in furniture and paneling. As for softwoods, they are mainly used for producing windows and door frames and other wood works. There are over 4000 woods commonly used throughout the world. The best and most widely used hardwoods are birch, chestnut, oak. As to softwoods the best known ones includes redwood, pine, red cedar.

1. Read the text again and answer the following questions:

1. What is timber?
2. What is it produced from?
3. What are the main advantages (disadvantages) of timber?
4. Why is removal of water from timber useful for construction purposes?
5. What are the two main types of timber?
6. What are softwoods (hardwoods) used for?

2. Find in the text the English equivalents for the following words and word combinations.

1) покрытие крыши
2) химические вещества
3) загрязнённый воздух

4) берёза
5) увеличивать
6) устранение
7) принадлежать
8) настилать крышу

3. Complete the following sentences:

1. Timber is wood, suitable for….
2. It has been from ancient times and is still produced from….
3. Besides timber is resistant to corrosion produced by …in the modern polluted atmosphere.
4. Removal of water from timber is …that should take place before timber is used in practice.
5. It increases… and … of the materials and of course it durability.
6. The two main types of timber are ….
7. There are over ….woods commonly used throughout the world.

4. Follow the keywords of each part of the text and make up a plan.

- the oldest building materials
- cut wood
- strength, light weight, cheapness, high workability
- resistant to corrosion
- easily decays
- contains water
- great structural defects
- hardwoods and softwoods

Part 3.
Aluminum

Aluminum is a considerably new structural material. For a long period it was considered to be rather expensive since its production required the use of electric power. Because of its relatively high cost, aluminum was not very popular as a construction material till the middle of the twentieth century.

The advantages of aluminum is its high strength combined with lightness. High purity aluminum is soft and ductile but its great

drawback is that it is not strong enough. At the same time it has high corrosion resistance and is used in construction of building as bright foil for heat insulation, roofing, exterior and interior architectural ornamentation. One more advantage of aluminum is that it can be easily remelted over and over again.

Aluminum alloys are much harder and stronger than pure aluminum. Besides, pure aluminum is rather difficult to cast while many of its alloys are extremely easily to cast. Pure aluminum is alloyed with other metals and these combinations possess a great variety of usage. For example, when it is alloyed with copper, aluminum possesses additional strength. Unfortunately, it is much less corrosion resistive than alloys with manganese, chromium, or magnesium and silicon.

One more advantage of aluminum is that it can be easily remelted over and over again.

Aluminum combined with oxygen forms a new oxide. Its name is alumina. Alumina is a colourless crystallic substance. It is solid and extremely durable.

It should be also noted that being an excellent conductor aluminum is widely used in power engineering. It serves for long – distance transfer of electric power.

1. Which of the qualities listed below can be classified as advantages/ disadvantages of materials used for construction purposes?

Advantages	Disadvantages

ductability, poor conductance, low durability, high corrosion resistance, high purity, low strength, low cost, excellent conductance, hardness, work ability, poor purity, high strength.

2. Answer the questions:

1. Why was aluminum unpopular for a long period?
2. What good qualities does aluminum possess?
3. Where is aluminum in the form of bright foil used?
4. What are the advantages of aluminum alloys?

5. Can aluminum be remelted?
6. In what way is alumina produced?
7. What are its properties?
8. What does aluminum serve in power engineering for?

3. Match the column on the left to the column on the right:

1. oxygen	a. значительно, гораздо
2. high cost	b. недостаток
3. considerably	c. окись алюминия, глинозём
4. expensive	d. передача, перемещение
5. drawback	e. проводник
6. alumina	f. кристаллическое вещество
7. conductor	g. гибкий, ковкий
8. transfer	h. кислород
9. crystallic substances	i. дорогостоящий
10. ductile	j. высокая стоимость

4. Make up a plan of the text and render it.

Part 4.
Concrete

Concrete is considered to be a universal material for construction. Different kinds of concrete can be used practically for every building purpose. The raw materials for producing concrete can be found in every part of the world. The main property is that it can be formed into strong monolithic slabs. Concrete is known to be fire and decay resistant.

Concrete is produced by combining coarse , fine aggregates and water. Coarse aggregate is generally gravel or crushed stone, and fine aggregate is sand. Cement, sand, gravel and water are taken in proportional amount and mixed. The quality of concrete depends mostly on the quantity of the cement used.

Concrete is preferred to natural rock, which is difficult to extract from the ground and which has to be worked to the required

shape. By means of concrete it is possible to form such parts of buildings as walls, floors, beams or columns, bridge supports and girders, dams, roads and airfield runways, or blocks of stone of any desired shape.

Concrete's main disadvantage is that it has no form of its own. Also, it does not possess useful tensile strength. Because of these qualities, in modern times construction concrete is very frequently combined with different metals.The introduction of metal into the structure of concrete is highly advantageous. It strengthens the material and helps to realize its limitless construction and architectural potential.

1 .Answer the following questions:

1. What properties make concrete a highly used construction materials?
2. What two types of aggregate are used for producing concrete?
3. Is sand a coarse or fine aggregate?
4. What ingredients does the quality of concrete depend upon?
5. How long does the process of mixed components last?
6. What qualities considered to be the main disadvantage of concrete?
7. What metals is concrete frequently combined with?

2. Choose the correct variant.

1. Concrete as a building material possesses
   a. only advantages
   b. both advantages and disadvantages
   c. only disadvantages
2. Concrete is considered to be a
   a. universally used material
   b. rarely used material
   c. not often used material
3. Ferro concrete is
   a. rather popular in modern construction
   b. not popular in modern construction
   c. gaining popularity
4. One of the good qualities of concrete is its

a. high cost
b. low cost
c. relatively low cost

5. Concrete
a. decays and burns
b. does not decay and burn
c. doesn't decay but burns

3. Complete the following sentences:

1. Concrete is considered to be …
2. The main property that makes concrete …
3. Concrete is produced by combining …
4. Cement, sand, gravel and water are …
5. The quality of concrete depends …
6. The process of hardening generally lasts for …
7. … ways of producing concrete.
8. Its main disadvantage is that …
9. The introduction of metal …
10. It strengthens the material …

Part 5.
Concrete (B)

1. New words and word combinations to be learnt:

hydraulic cement – гидроцемент
reinforced concrete – железобетон
pre-cast concrete – сборный железобетон
required shape – необходимая форма
mixture – смесь

2. Read the text and find the passages describing the characteristic features of reinforced and lightweight concrete.

Concrete is a kind of artificial rock made from hydraulic cement, crushed stone or gravel, and sand. It has the great advantage that it can be made in whatever shape is needed. For this reason concrete is preferred to natural rock, which is difficult to extract from the ground and which has to be worked to the required shape. By means of concrete it is possible to form such parts of buildings as walls, floors, beams or columns, bridge supports and girders,

dams, roads and airfield runways, or blocks of stone of any desired shape. Concrete may be delivered ready-mixed, but it is one of the few building materials that can be made on the building site.

In the making of concrete, the proportions of the sand, gravel, and Portland or similar cement are carefully measured. The strength of the concrete is partly determined by the amount of cement in the mixture. More cement would give a stronger, more durable mix, but would be more expensive. It is important not to use too much water as this will make the concrete weak. On the other hand, the concrete must be packed densely in the moulds, which cannot be done if the mixture is too dry. Producing concrete of good quality is therefore a skilled business. Nowadays mechanical vibrators are used to make strong compact concrete from fairly dry mixes.

Concrete is strong in its resistance to loads trying to crush it (compression),but much weaker in resisting forces that tend to pull it apart (tension). It is not therefore suitable by itself for making beams or other parts liable to be bent or pulled. To overcome this weakness, steel rods may be embedded in the mixture, thus forming reinforced concrete. Reinforced concrete was first developed in France by Joseph L. Lambot in 1849. To make reinforced concrete the steel rods are held in position and the concrete poured round them. The concrete bonds to the steel reinforcement. Any forces tending to pull the reinforced concrete apart will be resisted by the great strength of the steel rods, or bars. Nearly all concrete used for buildings and structures is reinforced.

The size of reinforced concrete beams can be reduced if the reinforcement is stretched before the concrete is poured into position and the pull maintained until the concrete is hard and strong. The stretching force is then removed and, as a result, the beam is compressed. This type of concrete usually has reinforcement in the form of wires and is known as prestressed concrete. Sometimes separate blocks of concrete are made with holes through them. Cables of wire are threaded through these holes so that the concrete blocks are like beads on a string. The cables are fetched, wedges are placed in the holes of the end block, and the cables are then released. The effect is to compress the row of blocks so that they form a beam or girder.

Lightweight concrete can be made by including processed clinker or air in the mix. Concrete can be made in different colours or painted with special paint. Different patterns can be made on the surface by using different types of shuttering. Sometimes the cement layer on the surface is removed after the concrete has set to expose the stones. This is called exposed aggregate. Concrete can be used for thin roofs called shells over large spaces such as gymnasiums or aircraft hangars. The thin slab is strengthened by curving. Pre-cast concrete is concrete already made into building sections for later use in housing, bridges, and other structures. They are taken to the site, lift by cranes, and fixed together with concrete.

3. Answer the questions:

1) What is a concrete?
2) Why is concrete preferred to natural rock?
3) How can concrete be made on the building site?
4) When was the reinforced concrete first developed?
5) What is the difference between reinforced, prestressed and lightweight concrete?

4. Match the Russian and English equivalents:

1. hydraulic cement	a. сборный железобетон
2. great advantage	b.луч
3. required shape	c.форма,шаблон
4. beam	d.лёгкий бетон
5. mixture	e.предварительный бетон
6. mould	f.необходимая форма
7. resistance	g.железобетон
8. reinforced concrete	h.большое преимущество
9. prestressed concrete	i.гидроцемент
10. lightweight concrete	j.смесь
11. pre-cast concrete	k.сопротивление

5. Complete the sentences in accordance with the text:

1) Concrete has the great advantage because:

a) it is made from hydraulic cement, crushed stone or gravel, and sand.
b) it is made in any shape.
c) it has to be worked to the required shape.

2) Concrete is the building material that:
a) can be made on the building site.
b) can't be delivered ready-mixed to the building site.
c) can support walls, floors, beams, columns, girders.

3) The strength of concrete is determined by the quantity of:
a) sand and gravel.
b) water.
c) cement.

4) To make concrete stronger:
a) it should be put under loads.
b) steel rods should be embedded.
c) it should be put under compression or tension.

5) The reinforced concrete beam is compressed because:
a) it is stretched.
b) the stretching force is removed.
c) holes are made through it.

6. Fill in the blanks in sentences in accordance with the content of the text and translate the sentences.

1) Concrete is a kind of …
2) Concrete is preferred to natural rock, which …
3) It is possible to form such parts of buildings as …
4) Concrete may be delivered ready-mixed but…
5) The proportions of the sand, gravel, and …
6) The strength of the concrete is partly determined …
7) Concrete is strong in its resistance …
8) Reinforced concrete was first developed …

7. Make a list of important features of various kinds of concrete.

8. Make a summary of the text.

UNIT II.

Part 1.
History and development of aerodrome construction

1. New words and word combinations to be learnt:
grassy field – поле с травяным покрытием
concrete surface – бетонная поверхность
sophisticated design – сложный проект
proper direction – правильное направление
angle of descent – угол снижения

2. Read the text and gain information about the earliest airfields.

The earliest aircraft take off and landing sites were grassy fields. The plane could approach at any angle that provided a favorable wind direction. A slight improvement was the dirty-only field, which eliminated the drag from grass. However, these only functioned well in dry conditions. Later, concrete surfaces would allow landing, rain or shine, day or night.

The title of "world's oldest airport" is disputed, but College Park Airport in Maryland, US, established in 1909 by Wilbur Wright, is generally agreed to be the world's oldest continually operating airfield, although it serves only general aviation traffic. Bisbee-Douglas International airport in Arizona was declared "the first international airport of the Americas" by US president Roosevelt. Amsterdam Airport Schiphol opened on September 16, 1916 as a military airfield, but only accepted civil aircraft from December 17, 1920, allowing Sidney Airport, Australia-which started operations in January 1920- to claim to be one of the world's oldest continually operating commercial airports. Minneapolis-Saint Paul International Airport , Minnesota, opened in 1920 and has been in continuous commercial service since. It serves about 35,000,000 passengers each year and continues to expand, recently opening a new 11,000 foot(3,355 meter) runway. Of the airport constructed during this early period in aviation, it is one of the largest and busiest that is still currently operating. Rome Ciampino Airport, opened 1916, is also a contender.

Increased aircraft traffic during World War I led to the construction of landing fields. Aircraft had to approach and landing slope. Following the war, some of these military airfields added civil facilities for handling passenger traffic. One of the earliest such field was Paris-Le Bourget Airport. The first airport to operate scheduled international commercial services was Houslow Heath Aerodrome in August 1919, but it was closed and supplanted by Croydon Airport in March 1920. In 1922 the first permanent airport and commercial terminal solely for commercial aviation was opened at Flughafen Devau near what was the Konigsberg, East Prussia. The airports of this era used a paved "apron", which permitted night flying as well as landing heavier aircraft.

The first lighting used on an airport was during the latter part of the 1920s, in the 1930s approach lighting came into use. These indicated the proper directions and angle of descent. The colours and flash intervals of these lights became standardized under the International Civil Aviation Organization (ICAO). In the 1940s the slope-line approach system was introduced. This consisted of two rows of lights that formed a funnel indicating an aircraft's positions on the glideslope. Additional lights indicated incorrect altitude and direction.

Following War II airport design became more sophisticated. Passenger building were being grouped together in an island, with runways arranged in groups about the terminal. This arrangement permitted expansion of the facilities. An improvement in the landing field was the introduction of grooves in the concrete surface. These run perpendicular to the direction of the landing aircraft and serve to draw off excess water in rainy conditions that could build up in front of the airplane's wheels. Airport construction boomed during the 1960s with the increase in jet aircraft traffic. Runways were extended out to 3,000m. The fields were constructed out of reinforced concrete using a slip-form machine that produces a continual slab with no disruptions along the length. The early 1960s also saw the introduction of jet bridge systems to modern airport terminals, an innovation which eliminated outdoor passenger boarding.

3. Answer the question:

1. What were the earliest aircraft take off and landing sites?
2. What is the oldest airport in the world?
3. What do you know about the slope-line approach system?

4. When did the airport use a paved apron?
5. What can you say about the improvement in the landing system?

4. Give the English equivalents to the Russian ones:
a) поле с травяным покрытием
b) участок для взлёта и посадки
c) бетонная поверхность
d) старейший аэропорт мира
e) принимать гражданские самолёты
f) вымощенная бетонная площадка
g) угол снижения
h) отводить лишнюю воду
i) углубление в поверхности бетона

5. Complete the sentences:
1) The earliest aircraft take off and …
2) Concrete surfaces allow landings…
3) The title of world's oldest airport is disputed, but…
4) Increased aircraft traffic during World War I led …
5) The airport of this era used a paved "apron", which …
6) Additional lights indicated …
7) Airport construction boomed during the 1960s …

6. Read the text again and choose the heading for each paragraph.
- World's oldest airport.
- Airport construction during the war.
- The first lightning.
- Airport design became more sophisticate.

7. Work in pairs and discuss the aspects of the aerodrome construction nowadays.

Part 2.
Road and aerodrome construction

1. New words and word combinations to be learnt:

- freight-груз
- dimension – измерение
- pavement – дорожное покрытие
- expansion – расширение
- installation – установка, сборка
- facility – оборудование
- previous study – предварительное изучение

2. Read the text and gain information about the best designed road.

Road and aerodrome construction

From year to year number of automobiles is increasing in our country. Large scale road construction work is going on all over Russia so as to provide all-year-round links between cities, villages, industrial centers. 60 % of total country's freight is hauled by motor transport. Thousands kilometers of road are put into service. New highways should comply with modern international specification. A modern highway is not simply earth covered with pavement.

A highway is a combination of complex engineering constructions. Modern highways are provided with service stations, repair shops, hotels, motels, other necessary facilities. Road building engineer is to design and build all these constructions. Road building work begins with proper selections of road. After a suitable road have been selected, the next procedure is clearing and then road location and design take place.

The best designed road is the one that links the given points by the shortest and the most direct route and has other advantages contributing to more efficient, lower cost freight transportation. Good knowledge of such subjects as survey, engineering geology, geodesy, hydraulics, strength of materials, theoretical mechanics, mathematics and others help engineers in their work.

Highway construction is done by the industrial method that includes wide applications of complex mechanization and automation. Computers are widely used in designing roads and calculation operations. A road and aerodrome engineer must be perfectly familiar

with all the road-building equipment, materials and construction techniques.

Aerodrome is area defined by ground or water(including all buildings, installations and equipment) partially or entirely dedicated to airships landing, take off or ground movement. Aerodrome construction requires series of previous studies regarding the locations as well as the necessary installations depending on the specific needs of the operation. The engineers analyse all aerodrome specific needs and the location, dimensions and infrastructure, and plan the aerodrome building with views to the future expansions according to the rise of traffic volume. Airsight has extensive knowledge in national and international specifications for the airport planning, design and operations for aerodrome.

3. Answer the questions:

1. How do you understand the term"modern highway"?
2. What kind of road design is considered to be the best?
3. What helps road building engineer to design and construct good highways?
4. What industrial methods of highway construction do you know?
5. What specific needs do the engineers analyse for aerodrome construction?

4. Match the English equivalents to the Russian ones:

1. strength of material	a. дорожное покрытие
2. comply with	b. обеспечивать
3. freight	c. перевозить
4. facility	d. сопромат
5. road location	e. масштаб,шкала
6. survey	f. расчистка
7. hydrolics	g. оборудование
8. application	h. соответствовать
9. to provide	i. разметка
10. to haul	j. груз
11. pavement	k. съёмка
12. clearing	l. гидравлика
13. route	m. применение
14. scale	n. маршрут

5. Fill in the blanks in sentences in accordance with the context and translate.

1. From year to year number of automobiles … in our country.
2. New highway should … modern international specification.
3. Road building works begins with … .
4. After a suitable route has been … , the next procedure is … and then … and … take place.
5. The best design road is the one that … … by the shortest and the most … … and has other advantages … … more…, lower cost … transportation.
6. Highway construction is done by the industrial … that includes wide … of complex … and … .
7. Aerodrome constructions requires series of … studies regarding to the … as well as the necessary … depending on the … … of the operation.

6. Make a plan of the text.

7. Summarise the text according to your plan.

8. Work in pairs and discuss the directions in the aerodrome and road construction.

Part 3.
Environmental impacts of roads and airports

1. New words and word combinations to be learnt.

contaminate – загрязнять	trench – ров,канава
byproduct – побочный продукт	fixture – арматура
snowmelt – снеготаяние	adverse – неблагоприятный
runoff – сток,слив	

2. Read the text and find out which paragraph gives information about the environmental impacts at each level of work in construction process.

Environmental impacts of construction.

Construction has significant impacts of both nearby communities and the natural environment. People and properties may be in the direct path of works and affected in a major way. People

may also be indirectly affected by construction, through the disruption of livelihood, loss of accustomed travel path and community linkages, increases in noise and pollution, and more road accident. Disturbances to the natural environment may include soil erosion, changes to streams and underground water, and interference with animal and plant life.

The construction process has particular environmental impacts and mitigation options at each level of work: site establishment and setup, construction work activities, and site restoration after the completion of work. During construction erosion is a major risk and can be prevented by prompt planting and control of runoff water. Traffic, noise, waste disposal and work practices are other important factors which need to be managed by the constructors.

Process during earthwork include excavation, removal of material to spoil, filling and compacting. A borrow pit and a water source should be located near or in reasonable distance to the road construction site. Approval from local authorities may be required to draw water or for working of materials for construction needs.

Water management system.

Careful design and construction of buildings can reduce any negative environmental impacts. Water management system can be used to reduce the effect of pollutants from construction. Rainwater and snowmelt running off roads tends to pickup gasoline, motor oil, heavy metals, trash and other pollutants and result in water pollution. Road runoff is a major source of nickel, copper, zinc, cadmium, lead and polycyclic aromatic hydrocarbons, which are created as combustion byproducts of gasoline and other fossil fuels.

De-icing chemicals and sand can run off into roadsides, contaminate groundwater and pollute surface waters; and road salt can be toxic to sensitive plants and animals. Sand applied to icy roads can be ground up by traffic into fine particulates and contribute to air pollution. Sand can alter stream bed environments, causing stress for the plants and animals that live there. Concentrations of air pollutants and adverse respiratory health effects are greater near the construction sites than at some distance away from it.

Road dust kicked up by vehicles may trigger allergic reaction.

Aircraft noise is major cause of noise disturbance to residents living near airports. Sleep can be affected if the airports operate night and early morning flights. Aircraft noise not only occurs from take off and landings, but also ground operations including maintenance and testing of aircraft. Noise can have other noise health effects. Other noise and environmental concerns are vehicle traffic causing noise and pollution on roads leading the airport. The construction of new airports or addition of runways to existing airports, is often resisted by local residents because of the effect on countryside, historical sites, local flora and fauna. Due to the risk of collision between birds and airplanes, large airports undertake population control programs where they frighten or shoot birds.

Restoration of work areas, especially quarries, borrow pits, work depots and material storage sites is an important aspect of contractor responsibility. Provision is also often required for follow up maintenance of restored vegetation. New roads may bring sensitive environments and the lifestyles of indigenous people.

The construction of airports has been known to change local weather patterns. For example, because they often flatten out large areas, they can be susceptible to fog in areas where fog rarely forms. In addition, they generally

Replace trees and grass with pavement, they often change drainage patterns in agricultural areas, leading to more flooding, run-off and erosion in the surrounding land. Some of the airport administrations prepare and publish annual environmental reports in order to show how they consider these environmental concerns in airport management issues and how they protect environment from airport operations. These reports contains all environmental protection measures performed by airport administrations in terms of water, air, soil and noise pollution, resource conservation and protection of natural life around the airport.

3. Match the Russian and English equivalents:

1. contribute to air pollutions	a. восстановление участка
2. de-icing chemicals	b. загрязнять грунтовые воды
3. road runoff	c. вызывать аллергические реакции
4. environmental impact	d. побочные продукты горения

5. polycyclic aromatic hydrocarbons	e. способствовать загрязнению воздуха
6. combustion byproducts	f. дорожный сток
7. contaminate groundwater	g. химические препараты против обледенения
8. trigger allergic reactions	h. полициклические ароматические углеводороды
9. site restoration	i. воздействие на окружающую среду

4. Answer the questions:

1. What can reduce any negative environmental impacts?
2. Name the pollutants, which contaminate the environment near the road.
3. What can you say about air pollutants and environmental noise generations?
4. Do you think that careful design and construction can reduce the harm?
5. What do you know about the changing of local weather patterns during the airport construction?

5. Complete the sentences:

1) Roads have significant impacts of both nearby communities and …
2) Disturbances to the natural environment may include soil erosion, …
3) Traffic, noise, waster disposal, and work practices are other important factors which …
4) Careful design and construction of road can …
5) Rainwater and snowmelt running off of roads …
6) Road runoff is a major source of nickel, …
7) Aircraft noise is major cause of noise disturbance to …
8) The construction of new airports or additional of runways to existing airports, is …
9) The construction of airports has been known to change …
10) These reports contain all environmental protection measures …

6. Find the passage describing the disturbances to the natural environment.

7. Based on the sentences from ex.5, give a summary of the text.

8. Work in pairs and discuss the problems of negative environmental impacts during the road and aerodrome construction.

Part 4.
Maintenance of roads

1. New words and word combinations to be learnt:

maintenance – содержание
excessive repair – чрезмерный ремонт
bitumen – асфальт
road network – дорожная сеть
asperity – неровность
sealing – герметизация, изоляция

2. Read the text and gain information about the causes of road deterioration.

Like all structures, roads deteriorate over time. Deterioration is primarily due to accumulated damage from vehicles, however environmental effects such as frost heaves, thermal carried out in the late 1950s, called the AASHO Road Test, it was empirically determined that the effective damage done to the road is roughly proportional to the Fourth power of axle weight. A typical tractor-trailer weighing 80,000 pounds(36.287 t) with 8.000 pounds(3.629 t) on the steer axle and 36,000 pounds(16.329t) on both of the tandem axle groups is expected to do 7.800 times more damage than a passenger vehicle with 2.000 pounds(0.907t) on each axle. Potholes on roads are caused by rain damage and vehicle braking or related construction works.

Pavements are designed for an expected service life or design life. In some countries the standard design life is 40 years for new bitumen and concrete pavement. Maintenance is considered in the whole life cost of the road with service at 10, 20, and 30 year milestones. Roads can be and are designed for a variety of lives (8,15,

30 and 60 year designs). When pavements lasts longer than its intended life, it may have been overbuilt, and the original costs may have been too high. When a pavement fails before its intended design life, the owner may have excessive repair and rehabilitation costs.

Virtually all roads require some form of maintenance before they come to the end of their service life. Pro-active agencies use pavement management techniques to continually monitor road conditions and schedule preventive maintenance treatments as needed to prolong the lifespan of their roads. Technically advanced agencies monitor the road network surface condition with sophisticated equipment such as laser/inertial Profilometers. These measurements include road curvature, cross slope, asperity, roughness, rutting and texture (roads). This data is fed into a pavement management system, which recommends the best maintenance or construction treatment to correct the damage that has occurred.

Maintenance treatments for asphalt concrete generally include crack sealing, surface rejuvenating, fog sealing, micro-milling and surface treatments. Thin surfacing preserves, protects and improves the functional condition of the road while reducing the need for routing maintenance, leading to extended service life without increasing structural capacity.

3. Answer the questions:

1. What does the term" deterioration" mean?
2. What are the main causes of road deterioration?
3. What pavement management techniques do the pro-active agencies use to monitor road conditions?
4. What do you know about preventive maintenance treatments?
5. What sophisticated equipment's and measurements do the agencies use to monitor road network?
6. What maintenance treatments for asphalt concrete do you know?

4. Match the Russian and English equivalents:

1. termal cracking	a. дорожная сеть
2. oxidation	b. проф.обслуживание
3. potholes	c. дорожное искривление
4. bitumen	d. сложное оборудование
5. excessive repair	e. дорожная сеть
6. rehabilitation costs	f. тепловое взламывание
7. design service life	g. асфальт
8. road network	h. выбоина
9. sophisticated equipment	i. чрезмерный ремонт
10. road curvature	j. окисление
11. preventive maintenance treatment	k. затраты на восстановление

5.Match the column on the left to the column on the right to make up sentences:

1) Pavements are designed	a) by rain damage and vehicle braking or a related constructed works
2) All roads require some form of maintenance	b) cross slope, asperity, roughness, rutting and texture.
3) Potholes on roads are cause	c) the owner may have excessive repair and rehabilitation cost.
4) Roads are designed	d) for an expected service life or design life.
5) When a pavement fails before its intended design life	e) before they come to the end of their service life.
6) These measurements include road curvature	f) for a variety of lives.

6.Find the passage about the expected service life of road and translate into Russian.

7. Scan the text and find out the information about the techniques to monitor road conditions.

8. Make a summary of the text.

Part 5.
Earthwork

1. New words and word combinations to be learnt.

- top soil-верхний слой почвы
- plasticity index-индекс пластичности
- road bed-основание дороги
- gravel-гравий
- embankment-насыпь
- rehabilitation-восстановление
- lump of clay-глыба глины

2. Read the text and gain information about the processes during the road construction.

Process during earthwork include excavation, removal of material to spoil, filling compacting, construction and trimming. A borrow pit (source for obtaining fill, gravel, and rock) and a water source should be located near or in reasonable distance to the road construction site. Approval from local authorities may be required to draw water or for working (crushing and screening) of materials for construction needs. The top soil and vegetation is removed from the borrow pit and stockpiled for subsequent rehabilitation of the extraction area. Side slopes in the excavation area not steeper than one vertical to two horizontal for safety reasons. Old road surfaces, fences, and buildings may need to be removed before construction can begin.

Trees in the road construction area may be marked for retention. These protected trees should not have the topsoil within the area of the tree's drip line removed and the area should be kept clear of construction material and equipment. Compensation or replacement may be required if a protected tree is damaged. Much of the vegetation may be mulched and put aside for use during reinstatement. The topsoil is usually stripped and stockpiled nearby for rehabilitation of newly constructed embankments along the road. Stumps and roots are removed and holes filled as required before the earthwork begins. Final rehabilitation after road construction is completed will include seeding, planting, watering and other activities to reinstate the area to be consistent with the untouched surrounding areas.

If rock or other unsuitable material is discovered it is removed, moisture content is managed and replaced with standard fill compacted to 90% relative compaction. Generally blasting of rock is discouraged in the road bed. When a depression must be filled to come up to the road grade the native bed is compacted after the topsoil has been removed. The fill is made by the "compacted layer method" where a layer of fill is spread then compacted to specifications, the process is repeated until the desired grade is reached.

General fill material should be free of organics, meet minimum California bearing ratio (CBR) results and have a low plasticity index. The lower fill generally comprises sand or a sand-rich mixture with fine gravel, which acts as an inhibitor to the growth of plants or other vegetable matter. The compacted fill also serves as lower-stratum drainage. Select second fill (sieved) should be composed of gravel, decomposed rock or broken rock below a specified Particle size and be free of large lumps of clay. Sand clay fill may also be used. The road bed must be "proof rolled" after each layer of fill is compacted. If a roller passes over an area without creating visible deformation or spring the section is deemed to comply.

The completed road way is finished by paving or left with a gravel or other natural surface. The type of road surface is dependent on economic factors and expected usage. Safety improvements like Traffic signs, Crash barriers, Raised pavement markers, and other forms of Road surface marking are installed.

3. Answer the questions:

1. What do you know about the processes during earthwork?
2. Why is the top soil and vegetation removed from the borrow pit?
3. What does the lower fill comprise?
4. What materials for construction needs do you know?
5. What can you say about final rehabilitation after road construction is completed?

4. Complete the sentences using the words from ex.1:

1) The … and vegetation is removed from the borrow pit and stockpiled for subsequent … of the extraction area.

2) The top soil is usually stripped and stockpiled nearby for …

of newly constructed .. along the road.

3) Blasting of rock is discouraged in the … … .

4) General fill material should be free of organics and have a low … .

5) Select second fill should be composed of … , and be free of large … … … .

6) The completed road way is finished by paving or left with a … or other natural surface.

5. Scan the text and find out the information about the general fill materials.

6. Look through the text and make a paragraph plan.

7. Render the text according to your plan.

8. Work in pairs and discuss the aspects of earthwork.