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АНГЛИЙСКИЙ ДЛЯ ИНЖЕНЕРОВ

УЧЕБНОЕ ПОСОБИЕ
по дисциплине «Английский язык»

Иркутск 2015
Рекомендовано к изданию редакционным советом ИрГУПС

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Учебное пособие составлено с учетом модернизации программ обучения, нацелено на совершенствование навыков чтения и перевода текстов по железнодорожной тематике. Пособие дополнено гlosсарием, текстами для самостоятельной работы, экзаменационными темами и рассчитано на студентов железнодорожных вузов. Данное учебное пособие имеет профессиональную направленность и поможет студентам углубить знания по своей специальности.
Ил. 27. Табл. 14. Библиогр.: 19 назв.

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I. TEXTS FOR STUDYING READING

Unit 1

From the history of railways

Railways play a very important part in the economic and political development of a country. Although we have now faster and more modern means of communication and transport, railways are still the safest and the most popular means of transportation.

It is difficult for the people living in the 21st century to imagine the opposition to the building of the first railways. Many people were afraid of the railways and did all in their power to stop railway construction.

The early railways were not like the railways we know today. The very first railways used horses for drawing trains and were built for transporting such products as coal, ore and timber. Later on, the horse-power railways appeared in large cities and were used as passenger transport. But these railways did not last long. The invention of steam locomotives made the railway the most important of all means of transportation.

In 1808 Richard Trevithick; an Englishman made an attempt to use steam power to draw passenger and freight trains. He demonstrated his working model in London. People looked at his little locomotive with great interest when it ran on a circular track of iron rails. For a shilling the public could travel in a carriage drawn by the steam engine. It developed a speed of 12 mph (19.2 kph). But one day a rail broke and the locomotive overturned.

Many people did not believe it was possible to make steam suitable for service. However, in 1829 George Stephenson, an English inventor and engineer, built a successful steam locomotive which he called the «Rocket». This locomotive was much smaller and lighter than the steam engines developed later on, and it was much slower. Nevertheless, it could draw a small train of loaded cars on the railway and developed a speed of 13 mph (21 kph). The «Rocket» is now demonstrated in the British Museum.

In Russia, many people had doubts about the possibility of using steam engine in the Russia winter. Nevertheless, the first steam railway was put into service at the Nizhniy Tagil metallurgical works. It was a short distance line of only 854 meters long. Another railway was soon constructed in 1837. It was a 15-mile public railway between St. Petersburg and Tsarskoye Selo. The first steam locomotive in Russia was built by the Cherepanovs, father and son, who were talented and skilled workmen of their time. Thanks to the Cherepanovs our country was one of the first countries to use steam as tractive power.

More than a century passed since that time. Many changes took place on railways. Still greater changes will take place in the future. We shall run more powerful locomotives and more comfortable cars. Greater speeds will be developed by diesel and electric locomotives. Railways will soon be operated by
means of electronic computers. A great number of other developments will be introduced.

In 1922 railway designers in Russia began working at the construction of the first diesel-electric locomotive for the freight traffic. The author of the project was Hackel I.M., a professor of the Leningrad Institute of Railway Engineers. The test model was produced at the Baltic Plant in 1924. It had an internal combustion engine connected to the running wheels by electric transmission. Several other models were built later. Locomotives with greater traction power and less consumption of fuel were needed. This resulted in the appearance of the TE-1, TE-2 models. In 1953 an experimental double-unit diesel locomotive of the TE-3 type was constructed. At present the most advanced diesel in series production is the TE-109 which is also available for export. It is powered by a 3,000 h.p. engine. Other railways place great hopes on a 6,000 h.p. diesel.

Notes:

mph – miles per hour – миљ в час
kph – kilometers per hour – километров в час

Words to be remembered
1. development – развитие
2. horse – лошадь
3. coal – уголь
4. ore – руда
5. timber – древесина
6. iron – железо
7. to be suitable – быть пригодным
8. possibility – возможность
9. tractive power – тяговый двигатель
10. to develop – развивать

2. Degrees of comparison.

Exercises

I. Give the three forms of the following irregular verbs:
   to begin, to build, to become, to take, to meet, to do, to put, to make, to see, to get, to come, to ring, to catch, to go.

II. Answer the questions (work in pairs):
   E.G. – What did he buy?
   – He bought a record.
1) Where did they go? 
........ to London.
2) Who did he meet? 
........ some friends.
3) What time did it leave? 
........ at 11:15.
4) When did they get there? 
........ at 12:30.
5) Which train did he catch? 
........ at 10:55.
6) What did she say? 
........ «Good-bye».
7) How much money did he take? 
........ $ 20.
8) Who did he ring? 
........ me.
9) How did he come? 
........ by train.
10) What did he forget? 
........ her telephone number.

III. Give nouns to the corresponding verbs:
To begin, to construct, to connect, to develop, to engage, to step, to manage, to suggest, to use, to meet, to need, to introduce, to apply.

IV. Open the brackets:
1. The Trans-Siberian railway is (long) in the word.
2. The weight of the empty wagon is (little) than the weight of the loaded one.
3. This last consideration is (important) of the three.
4. This train is (comfortable) than that one.
5. This train is (comfortable) of all.
6. This railway station is (large) than that one.
7. This railway station is (beautiful) in Moscow.
8. There are as (many) wagons on this line as on the other one.
9. There is as (much) load in this wagon as in the other one.
10. There are as (few) passengers in this car as in the other one.

V. Translate these sentences:
1. The beginning of our century was spoken of as a Golden Age of travel.
2. Steam engines were followed by the construction of diesel and electric locomotives.
3. The first passenger train drawn by steam locomotive was looked at with great interest.
4. Many new devices were not thought of before.
5. Modern speeds were not heard of 30 years ago.
6. The achievements of our scientists are often written about in different newspapers and magazines abroad.

VI. Change the active construction into the passive one:
1. The Cherepanovs, father and son, constructed the first steam locomotive in Russia.
2. We are building a new railway line in this region.
3. Every year we build many new houses.
4. A.S. Yartsev took the next very important step in mechanizing transportations.

VII. Read and translate the text. Make a plan of the text.

Russian railways

Railways play an important part in the economic development of our country. Russian railways are the key transportation mode of the country, carrying more than 80 per cent of the total freight traffic and more than 40 per cent of the passenger traffic.

Operating length of the Russian railways is 86,000 km, of which more than 36,300 km is double or multi track; 62,200 km is CTC (Centralized Traffic Control) – and signaling equipped. The length of electrified routes is 40,300 km. The Russian railways presently employ more than 1,3 million workers. Russia ranks second in the world (after the USA) in railway track length; third (after the USA and China) in the volume of freight traffic; third in passenger traffic (after China and Japan).

The recent years saw the increase in the operational (service) speed of the freight trains, the average weight of the freight train, average daily productivity of the locomotives and freight cars, as well as decrease in the freight car turn-round time.

The average speed of passenger trains is 48,8 km/h. Car fleet of freight trains consists of 464,4 thousand units and of passenger trains – 26,8 thousand units. Locomotive fleet is about 22 thousand units.

VIII. Read the text and make a plan:

The wheel, steam carriages and railways

One of mankind’s earliest and greatest inventions was the wheel. Without it there could be no industry, little transportation or communication, only crude farming, no electric power.

Nobody knows when the wheel was invented. There is trace of the wheel during the Stone Age, and it was not known to the American Indians until the White Man came. In the Old World it came into use during the Bronze Age, when horses and oxen were used as work animals. At first all wheels were solid discs.

The problem to be solved was to make the wheels lighter and at the same time keep them strong. At first holes were made in the wheels, and they be-
came somewhat lighter. Then wheels with spokes were made. Finally, the wheel was covered with iron and with rubber.

Light two-wheeled carriages were used widely in the ancient world. As time passed they were made lighter, stronger, and better. Later people joined together a pair of two-wheeled vehicle. At first only kings and queens had the privilege of driving in them.

In the West the first steam carriage was invented in France. The three-wheeled machine had the front wheel driven by a two-cylinder steam engine, and carried two people along the road at a walking pace. It was not a great success, as the boiler did not produce enough steam for keeping the carriage going for more than about 15 minutes.

The steam engine appeared in 1763. It was followed by several improved steam road carriages. Their further development was prevented by railway companies. The rapid spread of railways in the United Kingdom was due largely to George Stephenson, who was an enthusiast as well as a brilliant engineer.

He demonstrated a locomotive that could run eighteen kilometers an hour and carry passengers cheaper than horses carried them. Eleven years later Stephenson was operating a railway between Stockton and Darlington. The steam locomotive was a success.

In Russia the tsar’s government showed little interest in railway transportation. After long debates the government, which did not believe in its own engineers, finally decided to invite foreign engineers to submit (представить) projects for building railways in Russia.

Yet at the very time when foreign engineers were submitting their plans, in the Urals a steam locomotive was actually in use. It had been invented and built by the Cherepanovs, father and son, both skilful mechanics and serfs (крепостные). The first Russian locomotive was, of course, a «baby» compared with the locomotives of today. Under the boiler (котел) there were two cylinders which turned the locomotive’s two driving wheels (there were four wheels in all). At the front there was a smoke stack (труба), while at the back there was a platform for the driver.

IX. It’s interesting to know:

George Stephenson (1781–1848). Principal inventor of the railway locomotive and pioneer of the railway. The son of a mechanic, Stephenson became engine-wright at Killingworth colliery and it was there that he built his first engine that drew eight wagons with 30 tons of coal. In 1821 he built a steam locomotive, called the «Locomotion», for the Stockton-Darlington line, the world’s first public railway. In 1829 George Stephenson won a competition against three rivals with his famous «Rocket» and he
was commissioned to build eight locomotives for the 40-mile Liverpool-Manchester line which was nearing completion.

Robert Stephenson (1803–1859). The only son of George Stephenson, he assisted his father in constructing the Stockton and Darlington Railway. He made several improvements in locomotives and his principal achievements as a civil engineer were long-span railway bridges. The most notable of them was the Britannia bridge built in 1846-9. It spans the Menai Strait and connects the Isle of Anglesey to the Welsh mainland.

Stockton and Darlington Railway (железная дорога Стоктон-Дарлингтон). The world’s first railway. It was designed for carrying coal from the rich Durham coalfield to Stockton on Tees, a port on the North Sea. The original plan was to use horse traction on the 8-mile line, but it was changed in favour of Stephenson’s steam engine. The first engine ran from the town of Darlington to Stockton on 27 September, 1825, pulling a train of wagons with 450 persons at a speed of 15 miles per hour.

Notes:
mile = 1,61 km

X. Reproduce the dialogues «At the enquiry office»:
1. – Can you tell me from what station trains leave for Simferopol?
   – From the Kursk Station.
   – Are there several trains?
   – There are four trains from Moscow to Simferopol daily.
   – Which of them is the quickest?
   – Express No 7.
   – When does it leave Moscow?
   – It leaves Moscow at six o'clock in the afternoon.
   – And when does it reach Simferopol?
   – At half past seven in the morning the next day.
   – Is there a dining-car on the train?
   – Yes, of course.
   – And when does the train get to Kharkov?
   – At seven in the morning, the day after it leaves Moscow.

2. – I’ve found out from this timetable that there are several trains to Brighton daily.
   – Yes, quite so. The nearest is at 12:20.
– Well, I’ll take it. One ticket, please.
– Single or return?
– Single, please.
– Here you are. The train is leaving from platform 3.
– Is there a buffet-car on the train, please? I’d like to have a snack.
– Unfortunately, no. But if you hurry up, you can get a snack at a cafeteria in the station, otherwise you have to do without breakfast.
– Thank you very much.
– Not at all.
Announcement: The train now standing at Platform 3 is the 12:20.

XI. 😊 For fun:

Royal kindness

John Lowe, the English scientist and writer of the 15th century, was very poor in his old age. He asked the king for help. The answer was not long in coming. Henry VII wrote:
«Considering that Lowe has devoted forty years of his life to historical works by which he has brought fame to his country, we give him our royal permission to beg on the roads of England for one year. He can spend all the money thus collected on himself without paying taxes».

Notes:
1. the answer was not long in coming – ответ не заставил себя ждать
2. to bring fame – принести славу

Unit 2

Kinds of trains

Everybody knows railroads to have several different kinds of trains. They have passenger trains and freight trains and some railroads have «mixed trains», which are trains made up of both freight cars and passenger cars. Many years ago nearly all railroads had mixed trains but today mixed trains are found on only the least important branch lines. Besides the trains to carry passengers and freight, the railroads have special trains to assist them in their work of repairing and maintaining their right of way. Much of the work done by railroads must be done far from cities or towns, and to carry men and materials to these places the railroads must have «work» trains.
The work trains often have dormitory cars in which a large crew of laborers can be housed and fed out on the job for days at a time. Every railroad must have its «wreck train». This is a work train which specializes in clearing the tracks of wrecked cars or locomotives and repairing any damage to the roadbed caused by a wreck. The most important car of the wreck train is a huge crane which can pick up derailed locomotives or cars and set them back on the track.

Some railroads, especially the ones which run through forested country or have many miles of snowsheds along their routes, have «fire trains». The fire train carries powerful pumps as well as tank cars of water to serve the same purpose for the railroad as the fire engine does in your home town.

**Words to be remembered**

1. crew  
2. damage  
3. to house  
4. to feed (fed, fed)  
5. mixed train  
6. to pick up  
7. pump  
8. to repair  
9. tank car  
10. wreck train  
11. fire engine  
12. to assist = to help  
13. right of way  
14. dormitory car

**Words to be reviewed**

To carry, especially, to find, job, power, purpose, rail, run, route, to specialize, freight car, branch line, to run a locomotive.

**Grammar: 1. The Infinitive.**

**Exercises**

I. Find Russian equivalents of the following English word combinations:

Mixed trains, the least important branch lines, trains to carry passengers and freight, repairing and maintaining the right of way, far from the cities and towns, derailed locomotives, clearing the tracks of wrecked cars, the crew of laborers, repairing any damage to the roadbed, forested country, fire trains, fire engines, your home town, tank cars of water, to serve the same purpose.
II. Find English equivalents in the text:
Различные виды поездов, перевозить людей и материалы, пассажирские и грузовые поезда, огромный кран, работы по ремонту пути, бригада ремонтных рабочих, одновременно, вагон-цистерна, грузопассажирский поезд, пожарный поезд, мощные насосы.

III. State the part of speech of the following words and translate them into Russian:
Assist, assistance, assistant; speciality, specialize, specialization, specially, special; earn, earnings; to damage, damaged, damage, damageable; house, to house, housed, housing, houseless; to maintain, maintained, maintenance; to mix, mixture, mixer, mixed; rail, to rail, railage, derail, derailment; to repair, repair, repairable.

IV. Give English synonyms of the following American terms:
Railroad, sleeper, ticket office, switch, baggage, car, subway.

V. Complete the following sentences and translate them into Russian:
1. ... are found on only the least important branch lines.
2. ... must have work trains.
3. ... to the roadbed caused by a wreck.
4. ... along their routes have fire trains.
5. ... freight cars and passenger cars.

VI. Give definitions of:
1) a mixed train; 2) a work train; 3) a wreck train; 4) a fire train.

VII. Define the function of the Infinitive and translate the sentences into Russian:
1. To reduce the costs they keep all the equipment in good repair. 2. To make passenger cars last longer is one of the main problems of car builders. 3. The tank cars to carry chemicals are lined with nickel or stainless steel. 4. The railway uses new hopper cars to haul coal. 5. To convert a railway to electric haulage a costly reconstruction work is necessary. 6. To inform the driver of the location of the train ahead the light signals are fitted in the driving cab. 7. The electric energy to drive trains may be taken from the overhead wire. 8. The conductors to be used for transmitting the electric power to the trains are either the third rail or the overhead wire. 9. The speed to be attained by modern trains is often limited by the conditions of the track.

VIII. Pay attention to the construction «for + noun + Infinitive» and translate the sentences:
1. There is no need for us to tell you about the importance of installing the signal appliances at railroads.
2. The most difficult task for engineers to decide before beginning to build any railroad is to find a proper strip of land for this purpose.
3. The iron rails were not so durable for railroads to go on utilizing them.
4. It was necessary for railroads to introduce an interlocking system to prevent two trains from receiving a proceed signal at the same time.
5. There is no need for dispatchers to handle every track since centralized traffic control has been introduced.
6. That was for railroad engineers to decide very complicated problems of interlocking system.

IX. Answer the following questions:
1. What kinds of trains are found on railroads? 2. What cars are there in a mixed train? 3. What are work trains designed for? 4. What is the most important car in a «wreck train»? 5. What do you know about fire trains?

X. Translate the sentences into English:
1. На железной дороге есть грузовые и пассажирские поезда. 2. Большая часть работы должна выполняться далеко от города. 3. На каждой железной дороге должен быть аварийный поезд. 4. Огромный кран поднимает сошедшие с рельсов локомотивы или вагоны. 5. Раньше почти на всех дорогах были грузопассажирские поезда. 6. Аварийный поезд применяют для очистки путей от повреждённых вагонов или локомотивов.

XI. Retell the text in English:
In order to simplify the problem of running trains, all railroads except the very short ones are divided into divisions. A division may be three or four hundred miles or it may be thirty or forty miles long. Each division is operated just as a small railroad. A train with a long run is operated over many divisions. It may change engines and crews several times in the course of its journey.

Each railroad has two kinds of trains. They are regular and «extra» trains. A regular train is a «scheduled» train. Regular (certain) trains are operated every day. They have definite time of leaving and definite time for arrival at the terminals where they complete their runs. They are all numbered.

All regular trains are divided into freight and passenger trains. Passenger trains, in their turn, are subdivided into fast trains (expresses) which have long runs and make few stops and local which stop at all stations. As to freight trains they may be trains for carrying food products and other goods which make few stops during their runs, and trains which stop at small stations to load and unload freight and pick up and deliver single cars.
«Extra» trains are not scheduled in the railroad time-tables. Extra freight and passenger trains are both quite common on our railroads. Work trains and wreck trains always run as extra trains.

XII. Make written translation of the text (20 min):

The wreck train

Accidents are known to happen sometimes even on the best railways. A collision may occur, and cars and locomotives may leave the track. The rails may happen to be broken and traffic stopped. When this occurs it is the wreck train that is dispatched to the scene of the trouble.

We know the wreck train to be always ready to go at any moment. Its most important car is the crane car, a heavy car bearing a crane with an arm powerful enough to pick up an overturned locomotive and set it back upon the rails.

Besides the crane, there is a tool car containing a complete assortment of tools and other equipment needed in clearing away wreckage and making repairs to the track and to the cars and locomotives so that traffic might be resumed.

The other cars carry a supply of steel rails, wheels, axles and other necessary parts to replace those damaged in the accident.

The wreck train also includes the cars to house the kitchen, dining-room and sleeping bunks for the wrecking crew.

XIII. Discuss the possible reasons of the accident:

Train carrying empty flasks derailed

A train carrying spent nuclear fuel flasks has derailed as it arrived at a power station. Police says no one was injured in the incident outside the Torness power station near Dunbar, East Lothian.

The accident happened around 9.45 a.m., when two of the train carriages derailed. One of them was carrying an empty nuclear flask; the other had no load. The train was carrying three empty flasks in total.

The train was travelling at 5 mph when the derailment happened and none of the flasks were damaged, said Janine Claber, spokeswoman for freight company Direct Rail Services, a subsidiary of British Nuclear Fuels.
The incident took place adjacent to the east coast main line while the train was reversing at a railhead, but the derailed carriages remained upright and British Transport Police said disruption to passenger services was unlikely.

Ms. Claber added: «It was a very minor derailment which happened at low speed. The wagons remained upright and it did not happen on the main line».

Emergency services along with Railtrack and DRS personnel attended the scene.

All used nuclear fuel is transported in heavily shielded, purpose-built containers known as flasks, each weighing more than 50 tons, said Ms. Claber.

XIV. Reproduce the dialogue:

**Is it dangerous to travel by rail?**

*Ann:* The train is going very fast, faster than Russian trains.
*Steve:* We’re doing about a hundred and twenty miles an hour.
*Ann:* It’s over one hundred and ninety kilometres. Have there been accidents here? Are there many crashes on the railways in Britain?
*Steve:* We hear about some small accidents from time to time, but there has been nothing serious lately. It’s usually a minor breakdown or a power failure. There was a crash in a London Suburb about a year ago and that one was really bad.
*Ann:* Was anybody killed?
*Steve:* Two or three passengers were killed and quite a few people were injured. The locomotive was derailed and the train hit some structures on the side of the track.
*Ann:* We’ve had some rail accidents in Russia recently, but they were all freight trains.
*Steve:* Look, there is some information about British Rail in this booklet… Look, here are some figures. There were one thousand and fifty four accidents on the railways last year.
*Ann:* But only nine people were killed. Five of them were passengers and the other four were railway staff. Now, one hundred and forty persons were injured…
*Steve:* In the next paragraph, however, they say that about two hundred people were killed in the same year. You see, they are listed as trespassers and suicides.
*Ann:* So many accidents? The officals don’t want to call them accidents, do they? Isn’t it amazing? Only nine people are killed in real crashes and ten times, no, twenty times as many jump under a train because they want to die!
*Steve:* It’s clear about the suicides, but I wonder about the trespassers, how come they got killed?
Balzac and his handwriting

Balzac, the famous French writer, was a man of great talent. He wrote many novels which were translated into different languages and were known all over the world. But Balzac himself was proud of his ability of telling the character and behavior of a person by his or her handwriting.

One day a woman friend of Balzac brought him a young boy’s exercise book. She showed it to him and asked him to try and tell what Balzac thought of the boy’s character. The woman said that the boy was not her son and that Balzac might tell her the truth. Balzac studied the handwriting for a few minutes and then said: «Everything is quite clear to me. I shall tell you the truth». He asked the woman to pay attention to some features of the handwriting and said that the boy was a bad lazy fellow. «It can’t be possible», said the woman smiling. «This is a page from your exercise book which you used when you were a boy».

Unit 3

Power supply system

Till recent years we know all amount of electric energy to have been provided by thermal and hydro-electric stations, but they can’t meet the requirements of growing industry. Besides the supplies of fuel for thermal power stations are not inexhaustible. So our scientists discovered another type of energy – nuclear energy. We suppose atomic power stations to successfully compete with conventional power plants in many areas of the world.

The main and most wonderful feature of nuclear fuel is that it contains great thermal energy. The fact is that one kilogramme of nuclear fuel is equal to more than 2000 tons of coal. An atomic power station consumes, during a year’s continuous operation, only 30 tons of slightly enriched uranium compared with 2 500 000 tons of coal consumed annually by a conventional thermal power station of equal capacity.
As we know the most important part of a power station is a turbine which transforms the heat energy of steam or the energy of falling water into rotating mechanical energy and the alternator, in turn, converts the mechanical energy into electric power. All that remains is that this power should be placed at the service of the public. For this purpose the electric energy is sent to the electricity grid system of the country. It is this grid system that distributes the power to the consumers, including electrified railways.

Power stations generate what is called the alternating current. The fact is that this current can be more economically transmitted over long distances than the direct current. While the alternating current can be used to drive trains, in many countries it is turned into direct current as it enables d. c. motors to be used which are somewhat simpler in construction than a. c. machines. As is known, the conversion from a. c. to d. c. takes place in railway substations.

The first essential of a substation is a transformer in which the incoming electric current from the electricity grid can be lowered in voltage to one of the normal voltages for d. c. traction. Inside the substation there are rectifiers which convert the a. c. now lowered in voltage, into d. c. This one-way (i. e. direct) current is then fed to the railway supply system.

Most of the substations are equipped with automatic and remote control. It is a principle of electricity that current will flow only when there is a complete circuit. Therefore current mustn't only be taken to the trains, but provided with a path back to the substation after it has done its work in the motors. Generally this return path is through the axles, wheels and rails and partly through the ground.

Words to be remembered

1. thermal
2. nuclear
3. to consume
4. annually
5. conventional
6. equal
7. electricity grid system
8. to lower
9. rectifier
10. circuit
11. substation
12. axle
13. voltage
14. a. c. (alternating current)
15. d. c. (direct current)
Words to be reviewed
Power station, heat energy, to transmit (transmission), to drive trains, traction, power supply system, remote control, wheels.

Grammar: Complex Object.

Exercises
I. State the part of speech of the words:
To provide, provided; success, successful, successfully; atom, atomic; importance, important; to fall, falling; mechanic, mechanical, mechanically; electric, electricity; general, generator, generation; consume, consumer, consuming, consumed; drive, driver, driven, drove; simple, simpler, simplest; part, partly.

II. Read the text and complete the sentences:
1. …is equal to more … .
2. …can be used to drive … .
3. …is a transformer in which … .
4. … can be lowered in voltage … .
5. … is that this power should be … .
6. … from a. c. to d. c. … .
7. … the most important part … .
8. … that distributes the power to … .
9. … there are rectifiers … .
10. … during a year’s continuous operation … .

III. Read and translate without the dictionary the first and the second paragraphs of the text.

IV. Explain why the statements below are wrong:
1. Thermal power stations are considered promising because they work on cheap fuel.
2. Nuclear fuel is not promising.
3. Alternator transforms energy of steam into mechanical energy.
4. Direct current is turned into alternating current in railway substations.

V. Read the text and find out what makes:
a) alternating current more suitable for the operation of power plants;
b) substations as essential feature of electrified railways.

VI. Translate the sentences with Complex Object into Russian according to the model:
We know electric trains to develop a high speed.
(Мы знаем, что электропоезда развивают высокую скорость).
1. The engineers want further research to be conducted with linear induction motors (линейный асинхронный двигатель).
2. We consider atomic energy to be an efficient source of power.
3. As to magnetic cushioned trains the specialists consider them to have some advantages over air-cushioned vehicles.
4. We believe the tests with the automatically driven trains to have been completed with satisfactory results.
5. The locomotive drivers expect remote control to find application for operating industrial locomotives.
6. With particular interest people watched the crane erect the structures for contact wires.
7. The passengers waiting for the train could watch the track being renewed.
8. The students in the laboratory saw the engine tested.

VII. Find in the text sentences with Complex Object and translate them.

VIII. Answer the following questions:
1. What types of power stations are mentioned in the text?
2. What are the advantages of atomic power stations?
3. Why is alternating current turned into direct?
4. What are the main essentials of a substation?

IX. Make up questions:
1) Nuclear fuel contains great thermal energy (What).
2) Alternating current can be more economically transmitted over long distances than the direct (How).
3) Our scientists discovered nuclear energy (Who).
4) Inside the substation there are rectifiers (Where).
5) The fire train carries powerful pumps (What train).
6) We consider atomic energy to be an efficient source of power because it contains great thermal energy (Who, why).
7) Diesel traction was initiated in 1892 (When).

X. Remember the meaning of composite prepositions and phraseological units.
1. in conformity to согласно, в соответствии с
   according to
   in accordance with
2. as regards что касается
   as for
   as to
3. at the expense of за счет
4. on account of вследствие; из-за, благодаря
XI. Discuss advantages and disadvantages of accumulator batteries:

Transport and the environment

It is known that every type of transport has its effects on the environment. Motor cars, planes and locomotives pollute the air. It has been estimated that one car burns on average 2 tons of fuel per year using up to 27 tons of air in the process of burning. In addition, land and air transport is a main source of noise which is harmful for human health. The principal task is to find ways and means to reduce air pollution and noise produced by all types of transport.

Specialists pay much attention to electric transport. Electromobiles or battery-electric cars can meet the requirements mentioned above. They don't pollute the air and are practically noiseless in operation but they have the short range between recharging batteries. Besides the accumulator batteries are not only short-lived, they are too heavy and too expensive.

The important problem was to find the fuel cell to replace accumulators. The developed electrochemical generator called «Istok» is a good example. It consists of six fuel cells arranged in three units. A special reactor operating on hydrogen and oxygen generates electricity. The product of hydrogen-oxygen combustion is the vapour of distilled water. This generator is a miniature electric power station. The electromobiles fitted with it help to protect environment from the exhaust gases.
XII. Reproduce the dialogues:

1. (Mr. Grey is waiting at the railway station for a train)
   Mr. Grey: Hey! This train’s late. I’ve been waiting here for ages.
   Porter: Which train, sir?
   Mr. Grey: The 8:18 to Baker Street.
   Porter: The 8:18? I’m afraid you’ve made a mistake, sir.
   Porter: Oh, no, sir. The Baker train leaves at 8:08.
   Mr. Grey: At 8:08?
   Porter: You see, they changed the timetable at the end of April. It’s the first of May today.
   Mr. Grey: Changed it? May I see the new timetable. What does it say?
   Porter: It says: Baker Street train – 8:08.
   Mr. Grey: Oh! So the train isn’t late. I’m late.

2. – Which train do I take for Yalta, please?
   – You should take the train for Simferopol.
   – Do I have to change then?
   – Yes. There is no through train for Yalta.
   – Where do I change for Yalta?
   – In Simferopol you’ll change from the train to the bus for Yalta.
   – How long does it take to get there?
   – It takes roughly two hours and a half.

3. You: (Спросите, когда идет следующий поезд в Глазго)
   Clerk: At 8:40, sir.
   You: (Спросите, ночной (overnight) ли это поезд)
   Clerk: Yes, the train has sleeping accommodations.
   You: (Скажите, что не курите и хотели бы взять лучшие места)
   Clerk: I can give you first-class non-smoking compartment.
   You: (Спросите, когда он прибывает в Глазго)
   Clerk: It is due to arrive in Glasgow at 6:30 a.m.
   You: (Скажите, что вы надеетесь, что он прибудет вовремя (in time).)
   Clerk: Yes, sir, it usually runs in time.
   You: (Спросите, с какой платформы)
   Clerk: Platform 5.
   You: (Поблагодарите за информацию).
XIII. ☺ For fun:

The useful gate

For a long time Edison’s guests wondered why the gate to his garden was so difficult to open. A friend of his¹ said:
«The gate to your garden is so heavy that I have to use all my strength to open it. I cannot understand the reason. You are such a brilliant man. I’m sure² you could have invented something better».
«The gate seems to be quite all right»,³ Edison answered with a smile. «In fact,⁴ it is quite a brilliant invention».
«You are joking, aren’t you?»
«Not a bit.⁵ The gate is connected with a pump. Everybody who comes in pumps twenty litres of water out of the well».

Notes:
1. a friend of his – его приятель
2. to be sure – быть уверенным
3. the gate seems to be quite all right – калитка в полном порядке
4. in fact – в самом деле
5. not a bit – ничуть, нисколько

Unit 4

From the history of railcars and diesel trains

Self-propelled diesel trains running the passenger service in many countries of the world are successfully used on the lines where the operation of locomotive-drawn trains cannot be repaid. In the 1920’s there appeared steam-powered vehicles with a bus-type body which were named «railbuses». At about the same time efforts were made to build railcars powered by the internal combustion engine. Being designed for use on branch lines and in commuter service the vehicles could greatly reduce the operation cost over the routes with light traffic.

The majority of railcars being used nowadays are diesel powered and designed so that they can be coupled to other railcars and trailers, often to form trains of considerable length. Railcars are built with widely different power outputs depending on the type of service. Comparatively low-powered units for multiple-unit operation can be used for a wide range of duties. For handling light traffic, a single railcar coupled to a trailer may be used, but for heavier traffic, trains may be made of as many as twelve vehicles and include six power cars.
The first diesel-electric multi-car train was built in Great Britain in 1928. It consisted of four cars and weighed 144 tons empty. Its engine developed 50 h. p. and was installed in a special compartment of the leading coach, driver’s compartment being provided at both ends of trains.

The most outstanding developments, however, took place on the continent. In 1932, the first German high-speed diesel-electric train known as «The Flying Ham-burger» was placed in service. It was composed of two articulated coaches and its twelve-cylinder engines gave a combined output of 820 h. p. High-powered diesel-electric trains were also introduced in France, Belgium, Holland and Denmark.

The first diesel-electric trains of modern types built by British Railways (B. R.) appeared in 1954. The trains were employed in six-car formations and were composed of two power cars and four trailers. The design was similar to that used for main-line coaches, the bogies of the power cars being interchangeable with the motor bogies of electric stock. The engine and the generator together with the cooling equipment were installed in a special compartment.

**Words to be remembered**

1. to run the service
   осуществлять перевозки, обслуживание
2. commuter service
   пригородные пассажирские перевозки
3. to power
   приводить в действие, питать
4. power output
   отдаваемая (полезная) мощность вагон с дизельной установкой, моторный вагон
5. power car
   железнодорожная ветка
6. branch line
   маршрут, трасса, путь
7. route
   работа, производительность
8. duty
   порожний, пустой
9. empty
   отделение, купе
10. compartment
    машинное отделение
11. engine compartment
    поездной состав; формирование
12. formation
    взаимозаменяемый
13. interchangeable
    окупаться
14. to repay
    прилагать усилия
15. to make an effort
    предназначаться
16. to be designed =

to be intended
17. majority
18. to depend (on, upon)
19. to install
20. to compress = to make up (of)

Words to be reviewed
Bogie, truck, light traffic, heavy traffic, to handle the traffic, vehicle, internal combustion engine, operational cost, design.


Exercises

I. State the part of speech of the following words and determine their meaning:
Petrol, petrolic; drive, driver, driven, driving; couple, to couple, coupled, coupling; perform, performance, performing, performed; to speed, speed, speedy, speedily; reduce, reduced, reducing, reduction; direct, indirect, directly, to direct, directive, director, direction; improve, improvement, improved, improving; discover, discoverer, discovered, discovery, undiscovered; economy, economist, economically; critic, critically, critical; revolution, revolving; correct, correctly, incorrect, correction; compress, compressing, compressed, compressor, compression, compressibility; transfer, transferable, transference, transferor; convert, convertible, conversion, converter.

II. Remember the meaning of composite prepositions and phraseological units:
1. in addition to
2. in case of
3. in connection with
4. in order to
5. in relation to with reference to with regard to with respect to in respect of
6. despite
7. in spite of
8. instead of

кроме (в дополнение к)
в случае
в связи с
для того, чтобы
в отношении,
относительно
вопреки
несмотря на
вместо
III. Read the text without a dictionary (5 min) and speak on the main stages of diesel-electric train development.

IV. Pay attention to the pronunciation:
Brazil – Brazilian – Brazilia
Bulgaria – Bulgarian – Sofia
Canada – Canadian – Ottawa
China – Chinese – Peking
Denmark – Danish – Copenhagen
Finland – Finish – Helsinki
France – French – Paris
Greece – Greek – Athens
Holland – Dutch – the Hague
Hungary – Hungarian – Budapest
Italy – Italian – Rome
Japan – Japanese – Tokyo
Poland – Polish – Warsaw
Spain – Spanish – Spaniard – Madrid
Sweden – Swedish – Stockholm

V. Add three other forms of Participle I:
Being designed, being used, cooling, being provided, having been installed, having been introduced, transmitting.

VI. Translate the following word combinations:
A locomotive-drawn train, a valuable public carrier, a recent development, steam-powered vehicles, a bus-type body, powered by the internal combustion engine, with widely different power outputs, a wide range of duties, the first diesel-electric multi-car train, the leading coach, in six-car formations, similar to that used for main-line coaches, electric stock, the cooling equipment, to handle the passenger traffic, intended for multiple-unit traffic, suburban passenger traffic, motor car, for heavier operation.

VII. Complete the following sentences and translate them:
1. ...designed so that they can be coupled.
2. ...a single railcar coupled to… .
3. ...in a special compartment… .
4. ...which were named «railcars»… .
5. ...being interchangeable with the motor… .
6. ...were developed in answer to… .
7. ...in a special compartment… .
8. ... public carrier which is…. .
9. ... was similar to that…. .
10. ...designed for multiple-unit operation…. .

VIII. Change the sentences into negative and interrogative:
1) Efforts were made to build railcars.
2) Railcars are built with widely different power outputs.
3) It consisted of four cars.
4) The most outstanding developments took place on the continent.
5) The gas turbine can run not only on oil fuel but on pulverized coal and propane.
6) High-powered diesel-electric trains were also introduced in France, Belgium, Holland and Denmark.
7) It gives a considerable saving in the floor space.
8) The streamliner lost its identity as a train.

IX. Complete the sentences:
1. Its engine developed 500 h. p., …
2. It was composed of two articulated (сочлененный) coaches, …
3. The design was similar to that used for main-line coaches, …
4. The engine and the generator were installed in a special compartment, …
5. The engine of the train had spark plugs (запальная свеча), …
6. Trains may be made up of as many as twelve vehicles, …
7. The train consists of four cars, …
8. The vehicles could greatly reduce the operation cost, …
9. The locomotive with a gas turbine requires lower maintenance and repair costs, …
10. The gas turbine has several advantages over the diesel, …
11. The gas turbine is much smaller and lighter than the diesel, …
12. Many experiments have been made with gas-turbine locomotives, …
13. Such conditions are found in few European countries, …

X. You know four forms of Participle I. Find them and translate the sentences:
1. The most common type of the diesel engine being installed in modern locomotives is made up of several cylinders.
2. Railway engineers designing diesel-powered locomotives make great efforts to obtain higher efficiency combined with comparatively low weight.
3. Using diesel-electric multiple-unit trains on commuter lines railways increases the carrying capacity of the lines.
4. Having been built for use on commuter lines with light traffic, the railcars proved highly economical.
5. Being introduced on the lines with light traffic the railcars make it possible for the railways to quickly repay their construction costs.
6. The diesel locomotive is very popular, the chief reason for its popularity being the high thermal efficiency and suitability for heavy shunting work.
7. The engine has a lubricating system supplying the working parts of the engine with lubricating oil.
8. While building the first railcars the engineers installed gasoline engines to power them.
9. Being composed of railcars and trailers in various combinations, the self-propelled diesel trains better meet the requirements of commuter service than the locomotive-drawn trains.
10. Having been serviced by railcars and diesel trains, the line considerably reduced its operations costs.
11. The engine may have from six to twenty-four cylinders, the number or cylinders depending on the engine design and size.
12. With the first gasoline-powered railcars being unreliable and noisy in operation, the need for better railcars became obvious.

XI. Read the text and answer the questions:
1) Why were the first railcars developed and on what lines were they used?
2) What advantages could the application of railcars provide?
3) How are railcars arranged to handle light and heavy traffic in commuter lines?
4) Are all railcars built with the same power output?
5) What was the first diesel-electric multi-car train like?
6) The «Flying Hamburger» was built in 1945, wasn’t it?

XII. Translate the following sentences into English:
1. Дизельные поезда могут состоять из двух моторных и двух прицепных вагонов.
2. Автомотрисы применяют для пригородных пассажирских перевозок.
3. Тележки автомотрис взаимозаменяемы с тележками моторных вагонов электрического подвижного состава.
4. Состав поезда зависит от интенсивности движения.
5. Мощность автомотрис бывает различной в зависимости от типа выполняемой работы.
6. Дизельные поезда работают на линиях, где применение поездов с локомотивной тягой не окупается.
7. Много усилий приложили железные дороги, чтобы выдержать конкуренцию (meet the competition) других видов транспорта.
8. Двигатели автомотрис имеют сравнительно небольшую мощность.
9. Большие дизельные поезда имеют две кабины управления.
10. Машинное отделение и генератор установлены в головном вагоне.
11. Движение на этом маршруте осуществляется многофункциональными поездами.

XIII. Translate the questions:
1) Автомотрисы могли снизить затраты на перевозки на участках с напряженным движением, не так ли?
2) Автомотрисы строят с разной полезной мощностью, не правда ли?
3) Первый многосекционный поезд был построен в Великобритании, не так ли?
4) Он состоял из четырех вагонов, не так ли?
5) Поезда состояли из двух моторных вагонов и 4 трейлеров, не так ли?
6) Поезда могут состоять из 12 вагонов и 6 моторных вагонов, не так ли?

XIV. Render the text in English:
Автомотрисы предназначены почти исключительно для пассажирских перевозок. Они бывают разных типов: небольшие, используемые в пригородном движении на второстепенных линиях, и мощные, которые применяются для пассажирских перевозок на магистральных и международных линиях.

Имеются двухосные автомотрисы с максимальной скоростью 20 км/ч и дизелем 60 л. с. без прицепного вагона. В ряде стран введены в эксплуатацию облегченные автомотрисы мощностью приблизительно 125 л. с. и максимальной скоростью 90 км/ч. Число мест для сидения в них от 60 до 280; они имеют также помещения для багажа. Самые мощные автомотрисы обычно состоят из нескольких единиц и имеют максимальную скорость до 140 км/ч. Мощность таких автомотрис доходит до 2200 л. с. Выбор линии для эксплуатации автомотрис основывается на эксплуатационных (operational) и экономических соображениях (considerations). Гибкость автомотрис в эксплуатации позволяет применять разные их комбинации от одной единицы до длинных поездов с управлением по системе многих единиц. Использование автомотрисы рентабельно, если она оборудована кабиной управления с обоих концов.

XV. Remember the meaning of composite prepositions and phraseological units:
1. by force of в силу
2. by virtue of в свою очередь
3. in turn на основании
4. prior to до
5. but for если бы не
6. in favour of
7. with the exception
8. regardless of
9. for instance
   for example
10. ahead of time

XVI. Reproduce the dialogues:

A: Where are you going?
B: Pardon?
A: I asked you where you were going?
B: I’m going to the stationer’s.
A: To the station? Are you going away?
B: I said I was going to the stationer’s. I need some envelopes. I want to write some letters today.
A: I beg your pardon?
B: I said I wanted to write some letters.
A: You want to write letters at the station?
B: No! At home.
A: But you said you were going to the station.
B: No, to the STATIONER’S!
A: Ah, the stationer’s! Why didn’t you say so?

XVII. ☺ For fun:

His revenge

Niels Bohr (1885–1962), the famous Danish physicist, discovered many important laws concerning the structure of atomic nucleus. He always worked hard. But once it so happened that he had not prepared for his seminar at the university. His report was very bad and the teacher was surprised.

Bohr, however, did not lose the presence of mind and finishing his report said in conclusion:

«I have listened here to so many bad reports that I ask you to regard this one as my revenge.»

Notes:
1. to lose the presence of mind – терять присутствие духа
2. to regard as revenge – считать мстю
Unit 5

The choice of motive power

It’s not an exaggeration to say that the maintenance and further development of an economical and efficient transportation system is a matter of great importance to any country.

The problem of railway transportation should be approached from different points of view. In the first place, it should be studied as an economic problem, which attention being devoted to efficient and economical transportation since it is efficiency and economy which are basic to the progress of a country's national economy.

Again, railway transportation should be studied from the engineering point of view, attention in this case being given to the construction and maintenance of railways or to the designing of locomotives and cars.

Today railway transport has to meet the stimulating competition of air and road transport. To meet this competition successfully railroads have to improve continuously their service but at the same time, having provided the highest quality of service, railways have to reduce its cost. Technical developments can help in achieving this, including improvement in motive power and increased speeds of running. At present there are two principal kinds of motive power available: electric and diesel.

Electric traction. Having been introduced on railways electric traction provided greater reliability, good acceleration and higher speeds of running. As to the weight of the trains hauled electrics have no rivals. It should be mentioned that under electrification, the operation and maintenance costs are relatively cheap. However, the conversion of a railway to electric traction involves high initial costs, a large part of this cost being absorbed in the construction of structures to transmit the electric current from the power plant to the motive power unit. Because of the high initial costs involved, electrification can only be justified where there is a sufficient density of traffic. The greater the density of traffic the more favourable is the situation for the operation of electric locomotives.

Diesel traction. On those lines on which the traffic is not dense enough to justify electrification, diesel traction is normally employed. Diesel traction is cheaper to introduce than electric traction since it does not call for costly constructional work on the line. However, diesel locomotives are more expensive than electric locomotives of equal power. The cost of maintaining a diesel is three times greater than that of maintaining an electric. On the other hand, the diesel loco is not connected to the contact wire, like the electric locomotive, so it is particularly suitable for shunting work. One of the chief advantages of the diesel locomotive is the low cost of the fuel consumed.

Having compared two kinds of motive power one can say in conclusion that the most important requirement to be met by any kind of motive power is
to carry maximum volume of traffic at the highest possible speeds and at the minimum costs.

Words to be remembered

1. to meet the competition — выдержать конкуренцию
2. choice — выбор
3. to choose (chose, chosen) — выбирать
4. to devote (give) attention to — обращать внимание на
5. since (because, for, as) — так как
6. to include — включать в себя
7. principal (main, chief) — главный
8. available — имеющийся в распоряжении
9. operation cost — эксплуатационные расходы
10. maintenance cost — расходы на содержание
11. conversion (to convert) — превращение, перевод
12. sufficient — достаточный
13. justify — оправдывать
14. shunting work — маневровая работа
15. equal — равный
16. consume — потреблять
17. to call for — требовать

Words to be reviewed

Development, efficient, importance, engineering, construction, to design, to reduce, motive power, to introduce, to transmit, power plant, current, density of traffic, cheap, expensive, advantage, fuel, to meet the requirements.


Exercises

I. Translate these groups of words. Mind the suffixes and prefixes:
Exaggerate, exaggeration; efficient, efficiently, efficiency; attention, attentive, attentively; recognize, recognition; compete, competition, competitive; continue, continuous, continuously; reduce, reduction; regular, regularly, regularity; reliability, reliable; accelerator, accelerate, acceleration; dense, density; justify, justification; equality, equal, unequal, equally; consume, consumer, consumption.

II. Complete the following sentences:
1. Higher speeds of running can be provided by ...
2. Electric traction involves ...
3. A high construction cost under railway electrification comes from ...
4. Compared with electric locos diesel locomotives have ...
5. Shunting work is done by ...
6. The fact that diesel locos consume cheap fuel is their ...

III. Read the text and find out what each paragraph tells about.

IV. Translate the sentences paying attention to the Participle:
1. Having applied the radio and the telephone for sorting trains the railways improved the turnover of railway cars.
2. Having been introduced on railways, electric traction provided higher speeds.
3. Ballast supporting the track structure is made of broken stone.
4. Having been heated, the rails were carefully examined.
5. When designing the railway the engineers had many difficulties.
6. Having been tested, the electrified line was opened for public service.
7. The computer made the plan of the station's work, having processed the data on the freight trains.
8. With the fuel being built inside the cylinders, the engine has an increased efficiency.
9. The higher efficiency of fluorescent tubes has resulted in their being widely applied to lighting carriages.

V. Use English equivalents from the active vocabulary instead of the underlined words:
1. The low cost of the fuel is one of the main advantages of diesel locomotives.
2. Great attention is given to the proper maintenance of the electric rolling stock as the repairs of the electric equipment are very costly.
3. A diesel locomotive is more expensive than an electric locomotive of the same power.
4. The construction of electric railways requires a high initial cost.
5. Electricity is justified on the lines with heavy traffic.
6. The building of structures for the catenary is a costly business.
7. Many railways have been transferred to electric haulage.

VI. Translate the sentences into English:
1. Большое внимание уделяется выбору тяги (дvigущей силы).
2. Выбор тяги – важная проблема для любой железной дороги.
3. Электрическая тяга наиболее перспективна с точки зрения скоростей.
4. Следует помнить о высокой строительной стоимости электрических железных дорог.
5. Современные локомотивы, имеющиеся в распоряжении, могут разывать высокие скорости.
VII. Answer the questions:
1. What are the main requirements for a transportation system of any country?
2. What are the principal kinds of motive power?
3. What are the main advantages of electric traction?
4. What increases the initial cost involved in railway electrification?
5. Why is it cheaper to introduce diesel traction than electric traction?
6. What is the main requirement for any kind of motive power?

VIII. Make up summary of the text.
IX. Make written translation of this text (30 min):

Electric and diesel locomotives

The question now being studied carefully by railway engineers is whether the diesel or electric locomotive will haul the trains of the future.

Having developed lighter and cheaper structures for carrying the overhead wire some specialists speak in favour of electrification even in countries where large scale diesel programmes have already been carried out. However, where the investment in diesel motive power per mile of track is approximately equal to the per-mile cost of electrification, the possibility of using electric motive power should be carefully studied. It should be mentioned that progress with both types of motive power will cause some interesting competition between them. The higher the speeds developed and the lower the operation costs achieved the more favourable will be the situation for this or that type of traction.
X. Translate the text without a dictionary:

Diesel and electric traction

Diezel traction is employed on lines where the traffic is not dense enough. It's also suitable for switching services because the diezel locomotive is not connected to the overhead wires. The question is whether the diezel locomotive will be able to compete with the electric locomotive. To answer this question it is important to know the advantages and disadvantages of the two kinds of motive power.

Their three common features are the following:
1) they are always ready for service because the engine can be started during a minute or two in any weather;
2) they can develop a high tractive effort at low speeds and can start and accelerate heavy trains;
3) diesel locomotive haulage can be eliminated and replaced by self-propelled trains composed of railcars and trailers similar to the electric multiple-unit trains.

But there are some drawbacks (disadvantages) of the diesel locomotive:
1) the diesel locomotive is more expensive to build and maintain than the electric of equal power because it carries a power plant on itself;
2) the diesel engine pollutes an air;
3) its noise and vibration;
4) it runs on organic fuel which is exhaustible.

XI. Remember the meaning of composite prepositions and phraseological units:

1. by way of — посредством
2. on condition — при условии
3. close to — рядом, близко от
4. in advance — заранее
5. in advance of — впереди
6. in comparison with — по сравнению с
7. on behalf of — от имени
8. apart from — кроме, не считая
9. to be apart — быть на расстоянии, врозь
10. to this end — с этой целью

XII. Reproduce the dialogue:
– Porter, will you see to our luggage?
– What train, please?
– The 12:20 to St. Petersburg.
– What is your carriage number?
– Carriage number 5, please.
– Have you got any luggage in the clock-room (check room)?
– No, that is all we’ve got with us.
– Would you like to have any of your luggage registrated (checked)?
– Yes, we’d like to have these three trunks registrated. The rest is hand luggage. We’ll take it with us to the sleeper.
– All right, sir. This way, please. Your train leaves from platform 3, track 3.
– Thank you.
– Here we are! Carriage number 5.
– Will you put our suit-cases on the luggage-rack? Our is the third compartment.
– All right, sir. Anything else?
– No, that will be all.
– Your train leaves in 20 minutes. Have a comfortable journey!
– Thank you.

XV. 😊 For fun:

X-rays by post

This happened when X-ray treatment was still a new invention. W.K. Reontgen, the discoverer of X-rays, received a letter from a man. The man asked to send him «several X-rays with instructions how to use them». He explained that he had been shot in the chest and the bullet still remained there. «I should like very much to go to you myself but unfortunately I have no time».

The scientist replied: «I am very sorry but we have no X-rays now. And besides, it is very difficult to send them by post. But there is a simpler thing you can do: send your chest by post to me».

Notes:
1. X-rays by post – рентгеновские лучи по почте
2. X-ray treatment – лечение рентгеновскими лучами
3. I should like very much – я бы очень хотел

Unit 6

Diesel traction

Diesel traction was initiated in 1892 when Dr. Rudolf Diesel patented an engine to run on cheap oil fuel. The engine proved very economical and up-to-now bears the name of its inventor. The diesel engine belongs to the class of internal combustion engines in which the process of burning fuel takes place inside the engine itself. It's the feature that makes the engine very efficient.
The diesel engine originally served as a stationary engine but in a few years it was installed aboard a ship. The efficiency of this engine approaching 40%, it encouraged engineers to adapt it for use in land transportation. Many years had passed before diesel traction began to find application in railway transport, and steam locomotives used before were steadily replaced by diesels. The steam locomotive had a long life, the chief reason for the long popularity of the steam locomotive being its wonderful reliability and low initial costs. Why has the diesel locomotive taken place of steam?

The thermal efficiency of the steam locomotive is only about 7% (that is, only 7% of the heat contained in the fuel is turned into useful work). While that of the diesel is about 35%. In spite of the fact that the diesel costs twice as much as a steam locomotive of the same power the more expensive diesel is capable of doing so much work that its high cost may well be repaid quickly.

The diesel locomotive working perhaps a week without refueling and refilling with water, most of the diesel time is spent in hauling trains. The diesel locomotive is always ready for service, and even during the worst weather it can be started within a minute or two. Moreover, the diesel locomotive uses very little water, this advantage being of great significance in desert areas.

Russia may justly be called a pioneer in diesel traction. The idea of creating an entirely new type of motive power with a diesel engine had long ago interested Russian engineers and technicians. The transport difficulties in the early twenties led to scientists' interest in diesel traction. Large scale research and experimental work was conducted in our country. November 6, 1924 must be considered the birthday of the first main line diesel-electric locomotive in the world. This 1200 h.p. unit was designed by Prof. J. M. Gakkel and built by the Putilov steam locomotives works. This locomotive was soon followed by other diesels. Their tests having been satisfactory, the building of further diesel-electric locomotives was justified. A mass scale production of these locomotives started from fifties.

**Words to be remembered**

1. oil fuel
2. to belong
3. internal combustion engine
4. inside
5. to approach

дизельное топливо
принадлежать
двигатель внутреннего сгорания
внутри
приближаться
6. to find application  
7. reliability  
8. low initial costs  
9. twice as much as  
10. h. p. (horse power)

**Words to be reviewed**
Traction, inventor, fuel, efficient, steam, thermal, cheap, expensive, refuel, advantage, motive power.

**Grammar: Absolute Participle Construction.**

**Exercises**

**I. Complete the following sentences and translate them:**
a) 1. It's the feature…  
2. The efficiency…  
3. Many years…  
4. While that…  
5. The diesel locomotive…  
6. The transport…  
7. This locomotive…
b) 8. … of its inventor.  
9. … aboard a ship.  
10. … in railway transport.  
11. … initial costs.  
12. … useful work.  
13. … a minute or two.  
14. … in diesel traction.  
15. … by other diesels.

**II. Find corresponding English sentences in the text:**
1. Дизельный двигатель относится к классу двигателей внутреннего сгорания.
2. Паровозы, применяемые раньше, были заменены тепловозами.
3. Почему тепловоз заменили на паровоз?
4. Дизельный локомотив в два раза дороже паровоза.
5. Тепловоз может начать работать в течение одной или двух минут.
6. За этим тепловозом последовали другие дизельные локомотивы.
7. С 50-х годов начался массовый выпуск локомотивов.
III. Choose the proper variant:
1. The creation of a new type of motive power in our country was made possible due to…
   a) advantages of diesel traction.
   b) the great interest of Russian designers in diesel traction.
2. The world first diesel locomotive was created in our country within a short period of two years as a result of…
   a) large scale research and experimental work.
   b) the great economic difficulties.
3. A mass scale production of diesel-electric locomotives started in our country thanks to…
   4. a) the projects proposed by a number of scientists.
       b) the successful tests of the first diesels.

IV. Correct these wrong statements:
1. Diesel engine didn't prove very economical.
2. It was installed aboard a plane.
3. The chief reason for the long popularity of the steam loco was its speed and comfort.
4. The thermal efficiency of the diesel locomotive is 7 %.
5. The diesel costs as much as a steam locomotive.
6. The diesel can work for a month without refueling.
7. Most of the diesel time is spent in refilling with water.
8. This 1000 horse power unit was designed by professor A. N. Shelest.

V. State the main element in each attributive group and translate the sentences into Russian:
1. A modern high speed monorail has been put into operation in Tokyo.
2. Electronic computers are widely used to automate marshalling yard operations.
3. High powered diesel-electric locomotives are required for hauling long distance heavy trains.
4. The first main line diesel-electric locomotive was built and successfully tested in our country.
5. The 3600 h.p. direct current locomotives operating on 3000 volts are designed for passenger and freight trains haulage.

VI. Translate the sentences with Absolute Participle Construction:
a) 1. The diesel locomotive is economical and clean, its fuel being burnt inside the cylinder. 2. Diesel and automobile engines belong to the class of internal combustion engines, diesel engines being more efficient. 3. The telecommunication service being widely used at the marshaling yards, the sorting of trains has been greatly facilitated. 4. The information on the goods trains at the sort-
ing yard being processed by computers, the efficiency of sorting operations is very high. 5. The electronic machines being employed on London's underground, all signal and switches are automatically set for the passing trains. 6. Stations and other railway buildings being subjected to intensive vibration and noise, strong and sound-resistant materials should be used in their construction. 7. With the existing tracks being maintained in a good operating condition, the train can safely run at 160 kph.
b) 1. Driverless trains operating on this railway, only the human dispatcher is needed to direct all traffic. 2. The monorail having been built in Tokyo, the problem of traffic congestion was partly solved. 3. Hard manual labour having been replaced by machines, the construction work takes less time and money. 4. With the reconstruction of the terminal completed, the flow of passengers has been considerably increased. 5. The computer having processed the data on the freight trains, it made the plan of the station's work. 6. With the driver's cab equipped with radio, the danger of train collision can be easily eliminated.

VII. Write out from the text and translate the sentences with Absolute Participle Construction.

VIII. Open the brackets using the proper word:
many – much  few – little
1. A steam locomotive usually spent (many, much) time at the repair yard. 2. The diesel engine needs very (little, few) water, this fact makes it advantageous in desert areas. 3. There are (much, many) ways to increase the economic efficiency of our railways. 4. Since the first locomotives were not very powerful, they couldn't haul (much, many) cars. 5. Monorails, though having (many, much) advantages are (few, little) used throughout the world. 6. Before the fifties very (little, few) diesel-electric main line locomotives operated on the railways of our country.

IX. Give headings (in the form of questions) to each paragraph and write down the answers to these questions.

X. Speak on the following topics:
A diesel locomotive and a steam locomotive.
The first in the world main line diesel locomotive.

XI. Make written translation of this text using a dictionary:
Internal combustion engine

As the early internal combustion engines burnt gas, they had to be located near a gas-making plant and were all stationary engines.

Petroleum having been found in many parts of the world, an engine was designed that was capable of burning liquid oil obtained from this new substance. Freed its dependence upon gas the internal combustion engine has become a portable power plant, efficient and compact. When applied to automobiles, tractors and a great number of other machines the internal combustion engine has become one of the man’s most useful servants.

There are a number of different kinds of internal combustion engines, their differences being chiefly in the kind of fuel used and in the methods of introducing this fuel into the engine cylinders.

While the gasoline engine is an extremely useful device, it has some disadvantages, the chief of them being the high cost of gasoline. It was the high cost of gasoline that quickly encouraged the construction of an engine designed to burn oil instead of gasoline. A number of oil-burning engines were developed over the years, the diesel engine being the one used almost exclusively today for heavy jobs.

XII. Render in English:

Первый настоящий практическое применение двигатель внутреннего сгорания (Д.В.С.) был создан примерно через 150 лет после начала промышленного использования энергии пара. В 1860 г. французский ученый Ленуар построил двигатель, работавший на газе без процесса сжатия (compression). В 1877 г. в Германии Отто создал первый четырехтактный (four-stroke) двигатель. В 1895 г. немецкий инженер Рудольф Дизель создал двигатель, обеспечивающий максимальный КПД (efficiency). Двигатели с самовоспламенением (self-ignition) топлива, разработанные на базе двигателя Дизеля, являются наиболее экономическими тепловыми двигателями.

Дизель работает по такой схеме: в цилиндре воздух сжимается без топлива. Сжатие обеспечивает к началу подачи топлива температуру, достаточную для самовоспламенения топлива. После подачи топлива в цилиндр следуют процессы сгорания, расширения и выпуска: весь рабочий цикл может быть осуществлен за 4 или за 2 хода поршня. В зависимости от этого двигатели делятся на четырехтактные и двухтактные.
XIII. Remember the meaning of composite prepositions and phraseological units:

1. as long as  
2. as a matter of fact  
   in fact  
3. as though  
4. as well as  
5. at least  
6. at last  
7. in most respects  
8. in much the same way  
9. to be under way  

пока  
фактически,  
в действительности  
как если бы,  
как будто бы  
так же, как  
по крайней мере  
наконец  
во многих отношениях  
почти таким же образом  
создавать(ся)

XIV. Reproduce the dialogues:

– Hello! Porter! Can you take my luggage?
– Certainly. How many pieces?
– Two. I can carry this little parcel myself.
– Which train are you taking?
– The express for Simferopol. Is it in already?
– It is due to arrive in a few minutes. Will you go to the waiting-room meanwhile, or do you prefer to go straight to the platform?
– Let us go to the platform straight away.
– Here is your train coming in. Will you tell me the number of your car and berth?
– Carriage six, berth nine. I wonder whether it is an upper or a lower berth.
– I see from the number that it must be an upper one. Do you mind?
– Not very much. Of course I should like a lower one better, but after all I don’t mind much. (They enter the car)
– Please, put my two suitcases inside the box under the berth, and this little package on the rack.
(The porter does as instructed)
– Thank you very much. How much do I owe you?
– Forty rubles per piece of luggage.
– Here you are.
– Thank you.

XV. 😊 For fun:
Weather forecast

Two men were travelling in a very wild part of America. They did not see any houses but only tents where Indians lived. One day they met an old Indian who was sitting near his tent. He was smoking. The Indian was a hunter and
knew everything about the forest and the animals living in it and many other things. He could also speak English rather well.

«Can you tell us what the weather will be like during the next few days?» one of the two travellers asked him.

«Oh, yes», he answered. «Rain is coming, and wind. Then there will be snow for one or two days, but then the sunshine will come again and the weather will be fine».  
«These old Indians know more about world than we with all our knowledge of physics, maths and other sciences».  
«Tell me», he asked, «how do you know all that?»  
The Indian answered: «I heard it over the radio».

Notes:
1. forecast – прогноз, предсказание
2. sunshine – солнечный свет, хорошая погода

Unit 7

Advantages of diesel locomotives

The evolution of motive power has lead to the adoption of two principle kinds of locomotives for use on railroads: diesel and electric. The chief reason for the diesel locomotive popularity may be briefly stated as follows: a) high thermal efficiency; b) high percentage availability; c) suitability for heavy shunting work.

Its high percentage availability is the number of hours the loco is available for service in a year, expressed as a percentage of the total number of hours. Taken over a year’s working this figure amounts to 95 %. The explanation appears to be that the diesel locomotive is ready for work as soon as the engine is started and can go on working for perhaps a week without servicing (экипировка).

One of the outstanding features of the diesel locomotive is that it can operate without contact wires, which makes it possible for the locomotive to be used for heavy shunting work. In addition, you can couple two or more units together and the same crew can work two or three locomotives at once. The smaller diesels, and especially used for shunting, can be worked efficiently by one man only, the driver.

There are more technical advantages the diesel possesses. Although the diesel burns an expensive fuel, the diesel locomotive proved to be rather economical in fuel consumption. Moreover, the diesel locomotive needs very little
water. Because of low fuel and water consumption a diesel-powered train can make very few stops in long runs.

In a diesel the entire weight of the locomotive is available for adhesion. That is why this locomotive can develop a tremendous tractive effort at low or moderate speeds and can start and accelerate heavy trains.

And lastly, the locomotive haulage can be eliminated for some classes of service by employing self-propelled diesel trains made up of railcars and trailers in various combinations. Using trains of this type on the line where the application of locomotive haulage is not justified makes it possible to ensure notable economies.

**Words to be remembered**

1. thermal efficiency  
2. internal combustion engine  
3. availability  
4. to couple  
5. coupling  
6. unit  
7. crew  
8. fuel consumption  
9. adhesion  
10. tractive effort  
11. traction  
12. self-propelled  
13. railcar  
14. trailer  
15. haulage  
16. to adopt  
17. suitability  
18. in favour of  
19. to express  
20. to amount (to)  
21. explanation  
22. possess  
23. to eliminate  
24. to justify

**Words to be reviewed**

Motive power, to supply, engine, especially, advantage, available, to develop, application, efficiently, weight, possible, to start, speed, service.
Grammar: 1. Modal verbs «may, must».
2. Gerund.

Exercises

I. Read the text without a dictionary and write out 6 advantages of diesel locomotives.

II. Complete the following sentences:
1. … you can couple… .
2. ….the diesel locomotive needs… .
3. … some classes of service… .
4. … appears to be that… .
5. … a thermal efficiency… .
6. … popularity may be… .
7. … is burnt inside… .
8. … those used for… .
9. … can develop a tremendous … .
10. … is not justified … .

III. Agree or disagree:
1. Diesel locomotive is ready for work as soon as the engine is started.
2. The fuel is not burnt inside the engine itself.
3. The diesel locomotive can not operate without contact wires.
4. The diesel locomotive is economical in fuel consumption.
5. A diesel powered train makes many stops in long runs.
6. The locomotive can not develop tremendous tractive effort at low speed.
7. The diesel locomotive needs much water.
8. One of the disadvantages of the diesel locomotive is its high percentage availability.

IV. Give the names to the following or express in other words:
1) an engine in which the fuel is burnt inside the engine itself; 2) the number of hours the locomotive is available for service expressed as a percentage of the total number of hours; 3) using up water or fuel; 4) a self-propelled railway vehicle fitted with a diesel engine and traction motors; 5) a railcar which has no motors; 6) a train made up of railcars and trailers; 7) the power used in driving or pulling a train; the effort developed by a locomotive; 8) the work on making up trains or sorting trains and cars performed by a locomotive; 9) the process of connecting cars and locomotives; 10) a device used to connect railway cars or a train to a locomotive.

V. Translate the sentences with modal verbs «may, must» + Perfect Infinitive:
e. g. He must (may) have underestimated the importance of the problem.
1. Something may have happened to the engine as it does not work.
2. The structure of the engine must not have been strong enough for the engine broke down under load.
3. You may have read the thermal efficiency of an engine depends on the number of heat units converted into mechanical work.
4. The increase of locomotive power by increasing the number of locomotive units must have been the easiest but not the most effective way.
5. The designers must have tested many models before a locomotive with greater tractive effort and less fuel consumption was produced.

VI. Write the sentences in a logical order:
1. The diesel locomotive needs very little water.
2. In a diesel the entire weight of the locomotive is available for adhesion.
3. The diesel engine belongs to the internal combustion engines.
4. There are three main advantages of the diesel locomotive: high thermal efficiency, high percentage availability, suitability for heavy shunting work.
5. That is why this locomotive can develop a tremendous tractive effort at low speeds.
6. The diesel locomotive proved to be rather economical in fuel consumption.
7. There are more technical advantages the diesel possesses.
8. We know two principal kinds of locomotives for use on railroads: diesel and electric.

VII. Pay attention to the underlined words and translate the sentences:
A self propelled vehicle – самоходное транспортное средство.
1. A diesel engine is a form of heat engine which burns its fuel inside the engine itself. – Дизельный двигатель – это вид теплового двигателя, в котором топливо сгорает внутри его самого.

1) a self-programming computer;
a self-acting device;
a self-loading machine;
a self-closing door;
a self-governing device;
a self-ventilated motor;
a self-starting engine.

2) 1. The engineers themselves did not expect the results of their experiment to be so promising. 2. The diesel locomotive carries the power plant on itself. 3. Professor Gakkel himself tested his diesel-electric locomotive built at the Baltic Plant in 1924. 4. Automatic coupling is an important development adopter on railways; the automatic couplers themselves are simple in operation and maintenance. 5. The idea of containerization is as old as the railway itself.
VIII. What passage contains the most important information?

IX. Translate the sentences with Gerund:
e.g. Everybody knows of Russia being the pioneer in diesel traction.
(Все знают, что Россия первой применила дизельную тягу).
1. On being adopted for shunting operations the diesel locomotive proved very efficient and economical.
2. We are familiar with the diesel locomotive having replaced the steam one in shunting work.
3. Saving time is far from being the only advantage of automatic coupling.
4. The diesel locomotive is available for work for perhaps a week without going to the depot to be served and examined.
5. Gakkel’s inventing the first main-line locomotive is known to all the diesel locomotive designers.
6. We know of the Riga Car building works successfully producing railcars and diesel trains.
7. After having been introduced on the main-line rolling stock, the automatic couplers eliminated the dangerous labour of brakemen in shunting operations.

X. Read the text and answer the questions:
1) What do we mean by the «availability»? 2) What is the high percentage availability of a diesel locomotive explained by? 3) Why is the diesel locomotive most suitable for heavy shunting work? 4) Can one crew operate two or more locomotives at once? 5) Why does a diesel-powered train make few stops on long runs? 6) Why can a diesel locomotive start easily and accelerate heavy trains? 7) What is the reason for using self-propelled railcars and diesel trains?

XI. Find similar sentences in the text:
1. Дизельный двигатель принадлежит к классу двигателей внутреннего сгорания. 2. Коэффициент использования дизельного локомотива очень высок; он составляет 95 %. 3. Именно тепловоз применяется для маневровых работ. 4. Небольшой расход топлива и воды является одним из преимуществ тепловоза. 5. Хорошее сцепление колес с рельсами позволяет тепловозу развивать значительное тяговое усилие при низких скоростях. 6. Две или более локомотивные секции можно соединить вместе, чтобы управлять ими одной бригадой. 7. Тепловоз обладает целым рядом преимуществ.

XII. Translate any passage you like in writing.

XIII. Read the text without a dictionary and choose tasks given below:
The gas turbine locomotive

This locomotive operates much like diesel but instead of a diesel engine it has a turbine which is driven by a hot gas having great energy. The gas turbine has several advantages over the diesel:

1) It has only one large moving part, the shaft (вал).
2) It is much smaller and lighter.
3) The turbine requires no cooling water and is much simpler to lubricate (смазывать) than the diesel.
4) It provides greater reliability (надежность) and requires lower maintenance (обслуживание) and repair costs.
5) The gas turbine can run not only on oil fuel but on other kinds of cheap fuel, such as pulverized (порошкообразный) coal and propane.

Many experiments have been made with gas-turbine locomotives. In spite of (несмотря на) many advantages it has been found that such locomotives are not economical if they are not used at fuel power. In practice this means long uninterrupted (непрерывный) runs with heavy trains and such conditions are found only in few European countries. The most successful use of gas-turbine locomotives was made in the USA to haul heavy coal trains.

a) Speak on the advantages of gas-turbine locomotives.
b) Retell the text in English.
c) Prepare back translation of the text.

XIV. Make written translation of the text (20 min):

First commercially-produced diesel in America

In 1923 the first attempt was made in the USA to design an original diesel-electric locomotive. It was a 300 horse power 60-ton unit. This locomotive proved far more economical than the steam locomotive as regards fuel. Indeed, it could produce as much work on a tank car (цистерна) of oil as the steam locomotive did on twelve cars of coal.

As to the first commercially-produced diesel in America, it was designed and built in 1925. It was a 300-ton switcher similar in design to the pioneer of 1923.

Most Americans consider this locomotive to be «the grand-daddy» of US dieselization. It was like a box on a platform car. The locomotive had a driver's cab at each end. The power plant and the main generator were located in the
centre. This locomotive was in service until 1957 and now it is displayed in the Transportation Museum at Baltimore.

XV. Render the text in English:

Тепловоз ТЭРА1
(российско-американский электроприводный тепловоз)

1) Тепловоз ТЭРА1 создан совместно фирмой «General motors» и ОАО «Людиновский теплостроительный завод». В Людинове изготовлены кузов теплопоза, экипажная часть, приборы и устройства для пневматического тормоза. Дизель, тяговая передача, вспомогательное оборудование и микропроцессорная система управления сделаны американской фирмой «General motors». В экипажной части теплопоза ТЭРА1 имеются 3 тележки: первая и вторая – двухосные, а третья – четырехосная. На каждой оси установлен тяговый электродвигатель. На теплопозе ТЭРА1 установлен дизель модели 71063 В. Этот дизель был разработан в 1994 г. Его номинальная мощность – 450 лошадиных сил. Долгий срок службы и устройство обслуживания – отличительные черты двигателя.

2) В качестве основы управления локомотивом служит компьютер типа EM-2000. Он обеспечивает управление пуском и остановкой двигателя; возбуждением тягового генератора в режимах тяги и электродинамического торможения, устройством охлаждения двигателя. Кроме того, бортовой компьютер выполняет защиту всех узлов и устройств теплопоза при возникновении аварийных режимов, а также контролирует процесс проскальзывания колес по рельсам.

3) Теплопоз ТЭРА1 оснащен тяговой передачей переменнопостоянного тока, электродинамическим тормозом, действующим до полной остановки, средствами диагностики и противобоксовочной системой «Super Series». Таких теплопозов в России всего несколько. В Восточной Сибири они применяются только на станции ВСЖД Новая Чара. Там они используются для обслуживания Чинейского месторождения меди и магнетитов. К сожалению, возникают проблемы с ремонтом узлов и устройств, изготовленных американской компанией. В случае неисправности теплопоз может надолго выйти из строя из-за отсутствия необходимых деталей.

XVI. Remember English and American variants of the following words:

<table>
<thead>
<tr>
<th>американский вариант</th>
<th>английский вариант</th>
<th>значение</th>
</tr>
</thead>
<tbody>
<tr>
<td>apartment</td>
<td>flat</td>
<td>квартира</td>
</tr>
<tr>
<td>attorney</td>
<td>lawyer</td>
<td>юрист</td>
</tr>
<tr>
<td>baggage</td>
<td>luggage</td>
<td>багаж</td>
</tr>
<tr>
<td>billion</td>
<td>milliard</td>
<td>миллиард</td>
</tr>
</tbody>
</table>
XVII. Reproduce the dialogues:

a) – Will you tell me when our train leaves?
– We’ll be off in a minute. Be careful! The signal goes down.
– Sorry, I don’t get you.
– The train starts. We are already in the motion.
– Well, we are leaving on the dot. I hope we run on the time all along and nothing delays us.

Notes:
1. I don’t get you – я вас не понимаю
2. to leave on the dot – отойти минута в минуту по расписанию
3. to run on time – идти по расписанию

b) – Could you tell me when our train is due out?
– Well, we’ve got 10 minutes to spare.
– All right, I’ll go and get myself a newspaper or a magazine to while away the time during the journey.
– Mind you don’t miss the train, sir!
– I won’t.

Notes:
1. 10 minutes to spare – осталось еще 10 минут
2. to while away the time – чтобы «убить» время
3. to miss the train – опоздать на поезд
4. to delay – задерживаться

XVIII. 😊 For fun:

Science and imagination

Once David Gilbert (1862–1943) was asked about one of his former students. «Oh, this one?» remembered Gilbert. «He has become a poet. He had too little imagination for mathematics».

Notes:
1. imagination – воображение, фантазия

Unit 8

The factors governing the designing of the rolling stock

A big railway system needs many and various types of locomotives as well as carriages and wagons, the latter must be more numerous and varied than the types of locomotives. The designing of the rolling stock is a very complicated business because many factors ought to be taken into account by the designer. First of all, the design must be governed by the particular purposes the vehicle is to fulfil – the carriages to carry and, in case of long-distance trains, to feed and «to sleep» passengers; the wagons to haul almost every variety of goods.

Then the vehicles must be strongly built not only to carry their load but also to have a long life and a low cost of maintenance. On the other hand, the weight of the rolling stock is a factor which is not to be neglected either for the greater the weight of the vehicle the greater amount of fuel is required by the locomotive. The ideal railway carriage or wagon should be extremely light and strong and, at the same time, extremely roomy, that is to say, it must have maximum accommodation for the paying load.
There are other considerations which are to be taken into account in the designing of the rolling stock – cheapness of construction, the weight of the empty vehicle in proportion to its capacity and the so-called versatility of the vehicle. By versatility is meant the suitability of a car to carry as many kinds of goods as possible. You may have been told that this last consideration is of great importance because the greater is the versatility of the vehicle the bigger is the chance of its being loaded in both directions.

As to the passenger rolling stock, particularly for long-distance trains, the designer, besides providing seating and sleeping accommodations, has to provide a good deal of additional comforts, e. g. heating, lighting, ventilation, increased speed, reduced vibration and noise, the facilities for taking meals on board, etc. Moreover, modern standards require comfortable upholstery, not to mention artistic decoration.

**Words to be remembered**

1. to accommodate  размещать, вмещать
2. seating accommodations  места для сидения
3. sleeping accommodations  спальные места
4. paying load  оплачиваемый груз
5. empty  пустой, порожний
6. upholstery  обивка
7. upholstered car  мягкий вагон
8. to govern  определять, управлять
9. to vary  различаться
10. various  различный
11. variety  разновидность
12. complicated  сложный
13. to take into account  учитывать
14. particular  особенный
15. to fulfill  выполнять
16. roomy  просторный
17. versatility  универсальность
18. suitability  годность

**Words to be reviewed**

Types of locomotives, carriages and wagons, to design, a vehicle, to carry, long distance trains, to sleep, to haul, strong, a long life, cost, weight of the rolling stock, fuel, to require, light, cheap, to load, increased speed, comfortable, rolling stock.
Grammar:
1. Modal verbs «must, should».
2. Conjunction «the… the…» (чем… тем).

Exercises
I. Read the text without a dictionary (5 min) and say what factors should be taken into account while designing freight and passenger rolling stock.

II. a) Read and translate the following words:
Types of locomotives, wagons, a designer, business, factors, distance, passengers, a factor, maximum, construction, proportion, a chance, comfort, standards, ventilation, vibration, directions.

b) Define the part of speech of the words:
Various, numerous, strongly, designer, extremely, accommodation, capacity, importance, bigger, additional, decoration, roomy, possible, cheapness.

III. Give English equivalents:
Конструкция вагона, конструирование подвижного состава, конструктор нового вида транспортного средства, универсальный грузовой вагон, вес порожнего вагона, пропорционально его грузоподъемности, особенно в случае грузовых вагонов, строить прочно, перевозить почти все виды грузов, выполнять конкретную задачу, обеспечить дополнительные удобства, например, уменьшение шума и вибрации, увеличение скорости и так далее; способность вагона перевозить большое количество груза, мягкий вагон для поездов дальнего следования, места для сидения, спальные места.

IV. Express in other words:
An unloaded vehicle; the load which is paid for; the suitability of a vehicle to carry as many kinds of goods as possible, a railway vehicle having much room for the paying load, vehicles carrying both people and freight, a carriage having compartments with soft sleeping births.

V. Think of the English sentences corresponding to the Russian ones:
1. Конструкция вагона определяется его назначением.
2. Идеальный железнодорожный вагон должен быть легким, прочным и вместительным.
3. Конструктор должен учитывать вес порожнего вагона и его вместимость.
4. Универсальность вагона – один из важнейших факторов при конструировании грузовых вагонов.
5. Типы вагонов более разнообразны, чем типы локомотивов.
6. Вагоны должны иметь большой срок службы и низкую стоимость содержания.
VI. a) Translate into Russian:
1. The cleaner the oil the longer is the life of the axle boxes. 2. The wider the application of anti-corrosive materials to rolling stock construction the greater are the savings from its maintenance costs. 3. The lighter is the weight of an empty vehicle the greater is the permissible axle load.

b) Find two sentences of the similar construction in the text.

VII. Read the text and answer the questions:
1. Why is the designing of the rolling stock a complicated business?
2. What particular purposes are the vehicles to fulfill?
3. Why must vehicles be strongly built?
4. Why is the weight of the rolling stock an important factor?
5. What is meant by versatility of a vehicle?
6. Why is versatility of great importance?
7. What comforts should the designer of the passenger rolling stock provide?

VIII. Make up questions to the underlined words:
1. The designing of the rolling stock is a very complicated business.
2. A big railway system needs many and various types of locomotives.
3. The ideal railway carriage must have maximum accommodation for the paying load.

IX. Pay attention to the translation of the sentences with modal verbs «may and must» + Perfect Infinitive.
1. You may have been told that this last consideration is of great importance.
2. He must have been told that aluminium alloys are not suitable for the carrier structures of high-capacity wagons.
3. Reduced vibration and noise, as you may have known, are the factors, which are attached much importance to in designing of modern vehicles.
4. You must have heard that some chemicals as well as the excess of moisture (vlaga) may cause corrosion of unpainted carriages even if they are manufactured of alloy steels.

X. Find in the text two sentences with the verbs «to be, to have» in the meaning of «must».

XI. Speak on the main considerations to be taken into account in the designing of the rolling stock.
XII. Translate the text in writing (20 min) with a dictionary:

The constant growth in freight and passenger traffic on railways and the intensive utilization of the rolling stock require the continuous renewal of the existing car fleet and the development of numerous and varied types of freight and passenger cars that meet the present day demands.

The improvements of the technical characteristics of cars and the designing of cars must be governed by an increase of the carrying capacity of freight cars and their reliability, the decreasing of the amount of metal needed for manufacturing car members, the lengthening of service life of cars.

The cars of new designs are worked out on the basis of joint scientific research carried out by Car-Building Research Institutes and the car-building enterprises of the country.

Notes:
car fleet – вагонный парк

XIII. Reproduce the dialogue:

Travel agent: Good afternoon. Can I help you?
You: (Поздоровайтесь. Спросите, можно ли купить один билет до Москвы на вторник, 7 октября).
Travel agent: Let me see… I’m very sorry, sir. There are no seats left for Moscow on Tuesday.
You: (Спросите, остались ли билеты на тот же поезд на среду).
Travel agent: Just a minute, sir… Yes. There are some seats left for Wednesday.
You: (Скажите, что среда вас устраивает. Спросите, сколько стоит билет).
Travel agent: It’s 4500 rubles, sir. Here you are.
You: (Узнайте у агента, когда поезд прибывает в Москву. Поблагодарите агента).

XIII. 😊 For fun:

Uncle Philip

Tom’s uncle Philip was a scientist and an inventor. He carried out his research in the field of chemistry. He had been interested in chemistry since his childhood. He made a lot of discoveries and even received the Nobel Prize in chemistry. But he was a strange man, he lived alone, had no wife or friends. Once when he was quite old and seriously ill he sent for his nephew. Here it must be explained that this was the first time Tom and his uncle met. Many years earlier Philip had a big quarrel with his sister, Tom’s mother, and since then he had steadily refused to meet them.
When Tom came to see him, Uncle Philip was lying ill in bed. «I am a rich man», he said, «and I’m determined to leave all my fortune to you. You will find it in an iron box in the bank. But before you open the box you must read the letter which is on top of it». Soon his uncle died. After Uncle Philip’s death Tom went to the bank. Before he started to open the box, he read the letter. Here is what it said:

«Dear Tom, this box contains a great fortune. I am leaving it to you because I want you always to remember your dear uncle. The box also contains powerful dynamite which will explode as soon as you open it. If you do not believe me, open it and you will be blown into atoms. Do not forget your uncle».

From that time on Tom could think of nothing but the box and the fortune. He asked everyone for advice. But nobody could think of a safe enough plan.

Notes:
1. scientist – учений
2. inventor – изобретатель, открыватель
3. quarrel – ссора
4. to explode – взрываться

Unit 9

The materials used in car construction

The bodies of the first passenger and freight cars were manufactured of wood. And although the underframe, the roof and ends of the wooden cars were made of steel, they were not strong enough and could not ensure the safe travel for passengers. Moreover, being heated with coal-burning stoves, the carriages were often set on fire.

The search for strength and safety led to all-metal cars. At first steel replaced wood in car construction. Being much stronger that the conventional wooden cars the steel cars contributed a great deal to increased safety and could provide a greater carrying and seating capacity.

However, steel has two drawbacks as the material of construction for cars: steel is heavy and it rusts. Steel rusts so easily if it is not protected by paint and a steel car will rust away much quicker than an unpainted wooden car. To get away with these two disadvantages of ordinary steel modern cars are manufactured with bodies made of alloy steel or aluminium. Some of alloy steels, such as stainless steel, are unaffected by rust while the others will rust though not so readily as ordinary steel. Besides, alloy steels proved to be lighter and much stronger in proportion to weight than ordinary steel.

The application of aluminium and its alloys to rolling stock construction is sure to be of great economic importance because of the advantages these materials offer as compared with steel. Aluminium being a light weight metal, the
Tare weight of the axle load can be greatly reduced. Unlike steel aluminium possesses good anti-corrosive properties. So its application results in considerable decrease of the rolling stock maintenance costs.

The principle type of freight car being manufactured of aluminium is a hopper. Aluminium hoppers are much lighter that the steel wagons and have greater carrying capacity. Being unaffected by rust, aluminium hoppers are particularly suitable for hauling corrosive cargoes. The experience has shown that the aluminium coal wagons will last three times as long as the steel ones. In recent years a great deal of plastics and other synthetic materials have found application in building cars, particularly passenger cars. Plastics reduce the weight of a car, increase the anti-corrosiveness and give savings in maintenance costs.

**Words to be remembered**

1. body  кузов, корпус
2. frame  рама (тележка вагона), каркас
3. underframe  рама вагона, каркас
4. the ends of the car  торцевые стенки вагона
5. all-metal  цельнометаллический вагон
6. seating capacity  вместимость
7. to rust  ржаветь
8. to resist corrosion  противостоять коррозии
9. corrosive cargo  агрессивный груз
10. anti-corrosiveness  антикоррозийность
11. alloy  сплав
12. alloy steel  легированная сталь
13. stainless  устойчивый против коррозии
14. tare weight  вес тары
15. axle  ось
16. axle-load  нагрузка на ось
17. to ensure  обеспечивать
18. to lead (led, led) (to)  вести (к)
19. drawback  недостаток
20. to paint  красить
21. to affect  влиять
22. property  свойство
23. to give savings  обеспечивать экономию

**Words to be reviewed**

Passenger car, freight cars, travel, carriage, construction, conventional, safety, carrying capacity, rolling stock, weight, wagon, strength.

**Grammar:** 1. Complex Subject.
Exercises

I. Read the text without a dictionary (5 min) and answer the following questions.
1. What materials are used in car construction?
2. Why does alloy steel replace ordinary steel?
3. What are the advantages of aluminium and plastics?

II. Give English equivalents:

Кузов вагона; рама вагона, выполненная (изготовленная) из стали; обработать деталь; обеспечить прочность конструкции; цельнометаллический вагон; защитить вагон от коррозии (ржавчины) окрашиванием; противостоять коррозии; сплав, не подверженный коррозии; крыша, выполненная из легированной стали; способствовать в значительной мере повышению прочности; сплавы алюминия; нержавеющая сталь; недостатки обычной стали; вести к уменьшению веса тары; обеспечивать экономию; служить долго; уменьшить нагрузку на ось; агрессивный груз; увеличить грузоподъемность вагона; привести к увеличению вместимости вагона; обладать антикоррозийными свойствами.

III. Express in other words:
The cargo causing corrosion, the part of a railway vehicle on which a body rests, the car manufactured wholly of steel, the upper part of a car, the amount of freight a car can carry, the number of passengers a car can seat, the steel unaffected by rust, the weight of an empty vehicle, the load carried by an axle, the ability of a material to resist corrosion.

IV. Complete the sentences and translate them:

A.
1. Aluminium being a lightweight metal…
2. Some of alloy steels…
3. Being unaffected by rust…
4. Moreover, being heated with…
5. The principle type…
6. Plastics reduce the weight…
7. Being much stronger…

B.
1. … the safe travel for passengers.
2. … can be greatly reduced.
3. … than ordinary steel.
4. … maintenance cost.
5. … for hauling corrosive cargoes.
C.
1. The search for ... led to all-metal cars.
2. Steel ... drawbacks.
3. Steel ... easily.
4. Some of alloy ... by rust.
5. Plastics ... of a car.
6. The carriages ... fire.
7. The tare weight ... reduced.
8. An ordinary ... quicker than alloy steel.

V. Review the meaning of the composite prepositions:
- because of
- due to, thanks to
- owing to
- on account of
- by means of
- in accordance with
- according to
- in spite of

because of — из-за
due to, thanks to — благодаря
owing to — благодаря, вследствие
on account of — по причине, из-за
by means of — при помощи
in accordance with — в соответствии
according to — согласно
in spite of — не взирая на

1. Owing to the new system of regulations the number of accidents went down. 2. Thanks to the invention of the radio it has become possible to communicate with the remotest parts of the world. 3. The work was done in accordance with the adopted plans. 4. The engine runs without failure in spite of the overloading. 5. In fact, on account of friction we always get less useful work out of a machine than we put into it. 6. Due to a special safety valve it is possible to prevent damage to the tank. 7. The work is going on according to the schedule. 8. Wagons in tank trains are connected by means of flexible hoses.

VI. Translate the sentences with the Complex Subject according to the model:

The first steam locomotive is known to have been built by the Cherepanovs. (Известно, что первый паровоз построен Черепановыми).

1. The Trans-Siberian trunk line is regarded to be the most significant railway handling traffic between Europe and Japan. 2. The ways to perfect the performance characteristics of the main-line electric locomotive are expected to be the key topic of the conference. 3. After the test runs the locomotive was found to have some serious drawbacks in its design. 4. Despite its high speed the gas-turbine locomotive is unlikely to find a wide application because of producing much smoke and noise. 5. New a. c. electric trains are known to be equipped with silicon rectifier units. 6. The problem of
constructing a powerful electric locomotive happened to be successfully solved. 7. Automatic operation is known to maintain an efficient speed and smooth handling of the train. 8. The electric locomotive is considered to have the highest efficiency. 9. Similar arrangements are likely to be made to provide greater comfort to passengers. 10. The number of persons and freight transported by railways is supposed to vary greatly from one country to another.

VII. Find in the text sentences with Complex Subject and translate.

VIII. Answer the following questions:
1. Why were the early passenger and freight cars not strong and safe enough?
2. What parts of the wooden cars were made of steel?
3. What did the search for strength and safety result in?
4. How can the steel be protected from corrosion?
5. Are all alloy steels unaffected by rust?
6. What are two principle advantages of aluminium and its alloys?
7. Why have plastics found application in car construction?
8. What type of cargo is an aluminium car particularly suitable for?

IX. Prepare back translation of the 3rd abstract of the text.

X. Speak on the materials used for construction of freight car bodies:

Freight car body

The bodies of the first freight cars were built almost altogether of wood. Freight cars of today are made largely of steel. Nearly all open-top cars now built have bodies made wholly of steel, many box car bodies are also made of steel, and a great deal of steel is used in building our «wooden» cars. You don’t often see a freight car with a wooden roof. Many box cars which have wooden sides have steel ends. And in nearly all cars the underframe – the frame just beneath the floor – consists entirely of steel.

Steel replaced wood in freight cars for many reasons. The chief reason was that steel cars could be built that were much stronger than the conventional wooden car. Stronger cars meant cars of great carrying capacity and such cars were lighter in proportion to their capacity than the smaller cars. That is, two cars each of which will hold 25 tons of freight weigh much more than single car that will hold 50 tons. Railroad managers naturally prefer to use the larger cars since freight can be hauled more cheaply in the larger cars.

XI. You are going to take part in a scientific conference. The information given below will help you, but you will have to present it in English:
Большая научно-исследовательская работа ведется по защите грузовых вагонов от коррозии. Исследования проходят по двум направлениям:
а) подбор конструкционных материалов, наименее подверженных коррозии;
в) разработка и внедрение различных методов антикоррозийной защиты.
Для изготовления грузовых вагонов в основном используются конструкционные стали общего назначения (general purposes).
Ответственные узлы и детали вагонной конструкции изготавливаются из стали, имеющей повышенную прочность и устойчивость к коррозии. Коррозионностойкие стали используются для внутренней обшивки (inner sheathing) кузовов вагонов, предназначенных для перевозок агрессивных насыпных (bulk) грузов.
Алюминиевые сплавы применяются для изготовления неответственных узлов грузовых вагонов. При выборе алюминиевых сплавов учитывают как их преимущества: снижение массы конструкции, уменьшение затрат на внешнюю (exterior) отделку, так и недостатки: высокая стоимость, малая прочность.
Пластмассы имеют идеальные антикоррозийные свойства, но из-за малой прочности их не применяют в несущих (carrier) конструкциях грузовых вагонов.

XII. Reproduce the dialogues:
– Will you tell me where my compartment is?
– Yours is compartment 5, in the middle of the carriage.
– Thanks. Here we are. Porter, the suitcase and bag can go on the luggage-rack.
– Right, sir.
– Thanks.
– I hope you’ll have a comfortable journey.

– Am I in your way?
– After you.
– Here we are. The door won’t open.
– Allow me…
– Don’t bother, I’ll manage it, thank you.

– What can I do for you?
– Will you tell me where my berth is?
– Here it is. The upper berth, please.
– May I occupy the lower one, please? Is it vacant?
– Sorry but you can’t. It is reserved.
– I see.
XIII. 😊 For fun:

An absent-minded writer

A well-known writer was once travelling by train. When the ticket collector came for the tickets, the writer could not find the ticket. The ticket-collector who had recognized the writer asked him not to be nervous about the ticket, saying that he would come for it at the next station. But at the next station there was the same difficulty, the writer could not find his ticket anywhere. «Never mind», said the ticket-collector, «don’t trouble yourself. I believe that you have got a ticket».

«I must find it», answered the writer, «I must know where I am going to».

Notes:
1. to be absent-minded – быть рассеянным
2. ticket-collector – билетный контроллер
3. to recognize – распознавать, признавать

Unit 10

Passenger cars

The first passenger cars were similar to stage coach bodies mounted upon flanged wheels. For a few years passenger cars continued to resemble horse drawn coaches. They made it possible for railroads to carry more passengers in a single train and the increased comfort and conveniences afforded the passengers made it possible for the trains to travel longer routes between important stops.

During the 19th century, passenger cars continued to be made larger and larger and particularly their interior furnishings were made finer and more luxurious. During the greater part of the last century, all of our passenger cars shared three important faults. First of all they were built of wood, even their trucks had many wooden parts. In the second place, these early cars were all heated by wood- or coal-burning stoves. But worst of all these cars all had open platforms at each end.

The first great improvement in passenger car construction occurred in the 1880's when the elimination of the open platforms was first accomplished. In the early part of the 20th century, steel began to replace wood as the material of construction for passenger cars. The all-steel car developed in the early 1900's became the standard equipment of our railroads for thirty years. These «standard» cars as they are called in order to distinguish them from the newer «streamlined» cars, were very heavy, often weighing 80 tons and more. Many
of them, particularly sleeping cars, were carried on six-wheel trucks.

The first departure from the standard steel car came in the early 1930's with the introduction of the first streamlined trains. The development of the diesel locomotive and the streamlined train were closely associated. The light weight passenger car was also a product of this development. The first streamlined cars were built to be as light as possible, partly because the diesel locomotives then available were not powerful enough to haul a train of «standard» cars, and partly because it would cost less to haul a lightweight train. The earliest of these cars were articulated, the elimination of one truck under each car reducing their weight still further.

These new cars were very popular with the traveling public but they had two disadvantages as far as the railroads were concerned. Being articulated, they couldn't be readily uncoupled from a train, and being of smaller size they could not be used in trains of standard equipment.

These disadvantages of the early lightweight cars were quickly felt and the use of articulated cars was shortly discontinued in favour of cars with their own individual trucks. The streamlined, light weight car of the early thirties rapidly developed into a car of much greater weight, one that was carried on its own trucks, and could be coupled with cars of standard size. The «streamlined» car of today is still somewhat lighter than the standard steel car, for aluminium and stainless steel are widely used in today's new cars just as they were in the early thirties. Because of their lighter weight, and improvements in the design of trucks, today's new cars, with but few exceptions, are also carried on four-wheel trucks.

**Words to be remembered**

1. stage coach body — корпус diligence
2. to mount upon — устанавливать, монтировать
3. flanged wheels — колёса с гребнем
4. to resemble — походить
5. luxurious — роскошный
6. to accomplish — совершать, выполнять
7. elimination — устранение, уничтожение
8. streamlined car — вагон обтекаемой формы
9. truck — тележка, колесо
10. to articulate = to connect — соединять
11. as far as concerned — что касается
12. furnishings — оборудование, меблировка

**Words to be reviewed**

Advantage, disadvantage, to burn, to carry, convenience, to cost, to distinguish, heat, improvement, increase, introduction, similar, size, weight, weigh, to be popular with.
Grammar: 1. Participle II.

Exercises

I. Give Russian equivalents of the following word combinations:
Horse-drawn coaches, the increased comfort and conveniences, interior furnishings, all-steel car, four-wheel truck, important faults (disadvantages), first of all, wood- or coal-burning stoves, passenger car construction, these early cars, in the early part of the 20th century, as the material of construction, the newer «streamlined» cars, the first streamliners, to haul a train of standard cars, to reduce weight, elimination of one truck under each car, disadvantages of the early lightweight cars.

II. Find English equivalents:
&ɬɚɧɞɚɪɬɧɨɟɨɛɨɪɭɞɨɜɚɧɢɟ, ɰɟɥɶɧɨɦɟɬɚɥɥɢɱɟɫɤɢɟɜɚɝɨɧɵ, ɫɩɚɥɶɧɵɣɜɚ-ɝɨɧ, ɩɨɟɡɞɷɤɫɩɪɟɫɫ, ɩɚɫɫɚɠɢɪɫɤɢɟɩɨɟɡɞɚɨɛɥɟɝɱɺɧɧɨɣɤɨɧɫɬɪɭɤɰɢɢ, ɧɟ-ɪɠɚɜɟɸɳɚɹɫɬɚɥɶ.

III. Make up a list of words and word combinations which deal with passenger cars construction.

IV. State the part of speech of the words and determine their meanings:
Accomplish, accomplishment, accomplished; advantage, disadvantage, advantageous; convenience, convenient, inconvenient, conveniently; couple, to couple, coupling, coupler; destroy, destroyer, destruction, destructive, destructible, indestructible; distinguish, distinguishing, distinguishable, distinguished; eliminate, elimination, eliminator; improve, improvement, improver; haul, haulage; particular, particularly, particularity, particularize; resemble, resemblance; similar, similarly, similarity.

V. Translate the sentences into Russian:
1. As a result of new scientific achievements and many innovations the economic productivity of the railways as well as utilization of technical equipment has been increased. 2. We know more about passenger train cars than about freight cars, for we have all ridden on passenger trains. 3. The first streamliners were built to be as light as possible. 4. These cars had two disadvantages as far as their maintenance was concerned. 5. Steel began to replace wood as the material of construction for passenger cars. 6. As railroads increased in number it became possible to perform longer journeys. 7. As to the design of the passenger car it was greatly improved.

VI. Analyze the sentences with the attributes:
1. Passenger train cars have been greatly improved in recent years. 2. The first passenger cars were similar to stage coach bodies mounted upon flanged
wheels. 3. The early cars were heated by wood- or coal-burning stoves. 4. The first great improvement in lightweight railroad passenger car construction occurred in the 1880's. 5. The streamlined lightweight car of the early thirties rapidly developed into a car of much greater weight. 6. In recent years the trailer flat car service has been considerably increased.

VII. Answer the following questions:
1. What did the first passenger cars look like?
2. What advantages did the first passenger car have over a stage coach?
3. What disadvantages did all the first passenger cars share?
4. What was the first improvement in the construction of a railroad passenger car?
5. What material was used for construction of a standard car?
6. What kinds of cars have replaced standard all-steel cars?
7. What tractive power was used to haul streamlined trains?
8. What material was used for construction of streamlined cars?
9. What do you know about the trucks of the first streamlined cars?
10. Why was the use of articulated cars shortly discontinued?

VIII. Translate the following sentences. Pay attention to the underlined words:
1. The newly designed locomotive is intended for passenger service. 2. The electronic computer installed in the locomotive can perform the control functions. 3. It is expected that by the end of the year the production of the new passenger cars will have been initiated. 4. The equipment tested proved reliable in operation. 5. The data obtained were transmitted to the central computer which supplied all information required. 6. Before opened, the railway ought to be carefully inspected. 7. When fully computerized, the sorting yards will be able to provide high efficiency and reliability of their operations. 8. Applied to railways the electronic devices have facilitated many transport processes. 9. Nobody knew what had caused the tragic explosion on the railroad. 10. It was reported that Boyton's strange railroad attracted great attention. 11. Railways are expected to compete with other modes of transport in future.

IX. Divide the text «Passenger train cars» into logically completed parts and give a heading to each of them.

X. Write short summary of the text.

XI. Comment on the figures mentioned in the text: Britain pioneered railways

The first railway was the Stockton and Darlington, opened in September
1825. It used a steam locomotive built by George Stephenson. A railway network was developed across the country by private companies in the course of the 19th century. By 1870 Great Britain had about 13,500 miles of railway. At their greatest extent in 1924, there were about 20,000 miles of track, run by 120 companies. In 1948 the railways were nationalized and were run by public authority, the British Transport Commission (BTC). As a part of a modernization program, steam locomotives began to be replaced by diesels in the 1950s and this was followed in the ‘60s by electrification. In 1994, British Rail was split up into 25 units that could be sold to the private sector.

At 31st March 1994, British Rail had 23,452 miles of standard gauge lines and sidings in use, of which 3,087 were electrified. It had 1,885 locomotives (1,625 diesel-electric and 260 electric); 1,820 diesel multiple-unit vehicles and 6,570 electric multiple-unit vehicles. On 31st March 1994 British Rail employed 115,546 staff. Passenger journeys made during the year totaled 713,2 million, including 341,3 million made by holders of season tickets.

XII. Retell the text in English:

London's underground

It was in 1863 that 30,000 Londoners used a new and strange mode of travel – the first underground railway in the world. This first line was four miles long.

Some engineers did not believe that the tunnel would withstand the weight of the traffic in the streets above.

They were sure that the houses would be shaken to the ground by the vibration and Londoners would be poisoned by the fumes from the engine. But the first line of the fantastic railway was completed and opened.

At present different types of trains are running in different directions. The old Tube runs under the centre of London with frequent stops. There are trains going out to the suburbs and making a few stops on the way and there are non-express trains going a very long way out into the country. The fares are all different and even the carriages are not alike.

Safety has always been one of the main concerns of London transport. The system is considered to be the safest form of transport automatic signaling worked by electric circuit which is operated by the trains themselves. A program machine controls routes and any changes are made automatically in no time.

The total length of the London Underground is 250 miles. The system carries two million passengers every day.
XIII. Reproduce the dialogue:
– How do you do.
– How do you do.
– I say, yours is the lower berth facing the engine, isn’t it?
– Yes, it is. What is it?
– Excuse my troubling you, but could you do me a favour?
– Most willingly.
– Would you be so kind as to let me occupy your berth? The point is, I’d like
to have the seat facing the engine.
– Oh, I see. It’s all right. Why worry?
– Thank you.
– Don’t mention it.

XIV. ☺ For fun:

All tickets, please!

«All tickets, please!» said inspector, appearing at the door of the carriage. After the tickets had been punched, the gentleman in the corner continued to
search his pockets and to show every sign of nervousness.

«Lost your ticket?» asked a fellow traveller. Then, «Why, you’re holding it in teeth all the time!»

The inspector punched the ticket and left. After this, one of the passengers said: «What an absent-minded man you are».

«Oh, I am not absent-minded at all», said the man. «I was chewing off last week’s date».

Notes:
1. to punch – пробивать

Unit 11

Types of freight cars

The very first freight cars were open-top wagons which had wooden wheels and were pulled by horses along wooden rails. They were followed by platform (flat) cars. Later, covered cars appeared. The cars on a freight train are seldom all alike; they are usually of different sizes and perhaps many colours. There are different kinds of cars for different kinds of freight. The simplest type of a car is a flat car. It is a platform car with neither sides nor ends above the floor. It
is used to carry logs, lumber, steel rails and beams, heavy machines. They can also carry containers. The container traffic reduces the cost of loading and unloading goods, decreases the danger of their breakage.

Another type of car is a tank car used for liquid goods. It has an opening on the top and a special device in the bottom.

The most common type of car is the box car. The body of the car is merely a huge box, with a sliding door on each side. The roof slopes gently towards each side, and in the centre of the roof extending from one end of the car to the other is a narrow «running board», over which trainmen may work or run. Box cars that carry grain in bulk must be fitted with «grain door» in addition to the ordinary doors. These grain doors are set across the lower half of the door opening, and they keep the grain from leaking out, when the car door is pushed back.

A refrigerator car is a special type of a box car, it is used for hauling food products. The walls, floor and roof are air- and waterproof to protect goods from heat.

There are two common types of open-top cars: the gondola car and the hopper car. The chief difference between these two is that the gondola car has a flat floor or bottom, while the hopper car has a floor which slopes downward from each end and in some cars from the sides too. The bottom of the car has two or more hoppers with doors that open downward. When these doors are open the entire contents of the hopper car will drop out.

The covered hoppers cars are used to carry all kinds of bulk materials that can not be exposed to the weather, such as sugar and clay, cement, dry, powdered chemicals, coal, ore, gravel. These cars are loaded through water-tight hatches in the car roofs and emptied through their hopper bottoms. They are designed for mechanized loading and unloading.

There exist special freight cars for special kinds of goods. The example of this car is a double-deck car used to carry automobiles, the transportation of which by rail is more economical than by road.

**Words to be remembered**

1. open-top wagon — полувагон
2. flat car = platform car — вагон-платформа
3. neither… nor — ни… ни
4. log — бревно
5. lumber — пиломатериал
6. beam — балка
7. to load — грузить
8. to unload — разгружать
9. to reduce = to decrease — уменьшать
10. bottom — дно
11. box car  крыйтый грузовой вагон
12. gondola car  полувагон
13. hopper car  вагон-хоппер (полувагон с разгру佐очным люком в полу)
14. contents  содержимое
15. bulk  большое количество, большие размеры
16. water-tight =  водонепроницаемый
    water proof  водонепроницаемый
17. right of way  полоса отвода

Words to be reviewed
Car, wooden rails, flanged wheels, different, stage coaches, kinds of cars, to haul, goods, to draw.

Grammar: 1. Perfect Infinitive.

Exercises

I. Give Russian equivalents:
To be much alike, different kinds of freight, the steam railroad, railroad manager, to protect loads from the weather, closed cars, open cars, the damage of breakage.

II. Define the part of speech of the following words:
Acquaint, acquainted, acquainting, acquaintance; haul, haulage, hauled, hauling; invent, inventor, invention, inventive, inventiveness; protect, protector, protection, protective, unprotected.

III. a) Find in the text synonyms of the following words and word combinations:
To resemble, various, type, carriage, generally, means of transportation, damage, freight, timber, discover, a lot of, not frequently, may be, to get to know, a box car, common, huge, to keep.

b) Read the text using these synonyms.

IV. Make sentences negative and interrogative:
1. Later, covered cars appeared.
2. There are different kinds of cars.
3. They can also carry containers.
4. The container traffic reduces the cost of loading and unloading.
5. Another type of car is a tank car.
6. It has an opening on the top.
7. The very first freight cars were open-top wagons.
8. Grain doors keep the grain from leaking out.

V. Answer the following questions:
1. What did the early freight cars look like?
2. What kinds of cars are used for the transportation of perishable goods?
3. What cars are used for the transportation of coal and lumber?
4. What do you know about modern freight rolling stock?

VI. Make up all types of questions to the sentences:
1. Coal could be carried in open cars. 2. There are different kinds of cars for different kinds of freight. 3. Our railroads have several classes of freight cars. 4. Bigger and better cars were invented for hauling different kinds of freight. 5. The early railroad was merely a new kind of highway.

VII. Define the function of the verb «to have» in the sentences:
1. There had to be much experimentation before some of the problems of construction and operation could be solved. 2. The railway will have to increase its speed. 3. There will have to be a considerable rebuilding of main lines. 4. Careful attention will have to be devoted to aerodynamic shape of the front end of trains. 5. Had the mechanical parts been completely new the service weight could have been reduced to 75 tons. 6. If the machinery compartment had had modern shape, it would not have been replaced by a new one. 7. We know electronic systems to have already been applied to the remote control in some signal boxes on British railway. 8. Signal interlocking is said to have been effected either by mechanical locks or by electromagnetic relays before the appearance of the electronically-operated system.

VIII. Analyze the combination «modal verb + Perfect Infinitive»:

a) 1. The train collision must have been caused by a damage of the trackside signal. 2. The track repair work may have delayed the arrival of the trains. 3. They must have failed from overheating. 4. The train may have been too heavy for one locomotive to haul.

b) 1. The bridge connecting the old and the new parts of the town shouldn't have been so narrow. 2. To avoid the accident on the dangerous section of the line the driver ought to have been more careful. 3. Taking into consideration all the drawback of the machine the tests ought to have been carried out on a large scale. 4. The track for the Trans-Siberian trunk line should have been made much stronger to avoid numerous accidents taking place in the early days of its existence.

c) 1. An extensive mechanization might have speed up the electrification of the first railways. 2. Without the steam locomotive we might not have had the highly developed railway network of today. 3. A small marshalling yard could not have sorted so many wagons a day without having been modernized. 4. The
construction of the first underground railway in Rome could have been completed in the early 1940’s but for the war.

Notes:
but for – если бы не

IX. Make written translation of the text:

Tank cars

Liquid freight, such as oil, acid, molasses, wine, milk or mineral water may be transported in tank cars. A tank car has a long, cylindrical tank. On the top of the tank is a dome with an opening through which the tank is filled and sometimes emptied. Most tank cars are unloaded by drawing off their contents through a valve in the bottom of the tank. Tank cars carrying acids or other dangerous liquids are unloaded either by sucking their contents out through the dome of the car or by pumping compressed air into the tank and «blowing» the contents out through the dome. Some liquids form gas if they become too warm, and tank cars have safety valves which open and permit the gas to escape when the pressure reaches a certain point.

Most tank cars are built of steel, but tank cars made of other materials, such as aluminium or wood, are also used. Some of the tank cars which carry acids are lined with lead or rubber because some acids will eat through ordinary steel. Tank cars used to carry other chemicals may be lined with nickel or with stainless steel. Tank cars which carry liquids which must be kept perfectly clean are lined with glass. Many tank cars must have coils of pipe inside their tanks through which steam can be piped when the cars are being unloaded. These cars are used for transportation of thick gummy liquids that will not flow easily unless they are hot.

X. Read the text and speak on the advantages of the container cars.

Container cars

The use of the containers for the movement of freight is increasing. These containers are large steel boxes, they can be packed into a flat car, gondola car, or into an open car, four or eight to a car. This car is of the standard type, with few additional fittings for attaching the container.
Containers may be lifted from the car and set upon a dray or a motor truck. The containers are packed with goods at a factory or warehouse, locked, sealed, hauled to the freight yards by trucks, swung into the freight car by cranes and carried to final destination. The container car reduces the work of loading and unloading cars at freight stations and lessens the danger of loss and breakage of the goods which they carry.

When container cars were first introduced they were thought to be used only for the transportation of valuable goods, usually shipped in less-than-car load quantities but soon they have been found to be also useful for carrying various kinds of low-grade freight. Many bricks are shipped in container cars, and they are also used for the transportation of cement. Some container cars are built, the containers of which are simply demountable tanks used in the transportation of milk and cream.

The considerable increase in container traffic will be accomplished by a modification of the container fleet in our country. High-capacity container (mainly 20–30 t) will play an active part, together with the average-capacity container (from 3 to 5 t), in carrying goods. Specialized type containers (rigid and elastic, closed and open) will remain in service. The container building industry will have to be developed to specialize mainly on constructing high-capacity containers. The delivery of containers will be effected by special high-speed container trains according to strict schedules. The loading of containers into wagons and lorries and their unloading should be mainly done by using container cranes with semi-automatic control which makes it possible to provide a smooth acceleration and breaking of mechanisms as well as realize high speeds of moving, lifting and lowering the containers. An automated container traffic control sub-system should be provided.

**Words to be remembered**

1. to attach крепить, прикреплять
2. demountable разборный
3. fleet парк
4. to lessen = to decrease уменьшать
5. loss потеря
6. to ship грузить
7. less-than-car load мелкая партия, сборный груз
8. low-grade низкосортный
9. to effect выполнять, совершать
10. to seal герметически закрывать
11. to swing (swung, swung) помещать
12. warehouse товарный склад
13. freight yard сортировочная станция
Words to be reviewed
Movement, flat car, additional, to haul, haulage, final, to load, to unload, goods, freight station, to introduce, useful, to carry, to increase, to play an active part, average capacity, service, schedule, semi-automatic.

XI. In case you are abroad mind the following:

arrivals
baggage check in
baggage claim
cart rental end
check in
first class only
attention
do not litter
$ 50 fine
don’t walk
walk
private property
bus stop
exit to bus
detour
no passing
railroad crossing
traffic circle
traffic line
no parking
auto repair
car wash
slow: children
speed limit 55

XI. Reproduce the dialogues:

– I hate to bother you, but could you help me with my luggage?
– You are welcome. Where will that suitcase go?
– Into the luggage rack.
– Will you move over a bit?
– All right. It was very kind of you to do it. Thank you.
– Don’t mention it.

– Do you mind my turning on the radio?
– Not at all.
– Do you mind my smoking?
– Please, don’t.
– All right. I’d rather go to the bookstall and get a morning paper.
– Hurry up! The train is due out in a few minutes.
– Don’t worry. I’ll make it.

Notes:
Will you move over a bit? – Вы не подвинетесь?

XIII. ☺ For fun:

Problems of cosmic and cosmetic physics

Lise Meitner (1878–1968) was the first woman-physicist in Germany. The title of her dissertation «Problems of cosmic physics» seemed absurd to one of the journalists. In his article about L. Meitner which he published in a newspaper he «corrected» the title of her dissertation and wrote «Problems of cosmetic physics».

Notes:
1. title of dissertation – заголовок диссертации

Unit 12

In search of higher speeds

Contemporary technology has not been able to cope with the problem of high speed mass transportation. Railroads move passengers with the speeds which don’t meet the present day requirements.

Speed, however, plays a dominant role for any passenger transport systems. High speed ground transport has been attracting the attention of railway specialists all over the world. At different periods of railway history record runs have been made and record speeds have been reached. They proved that the possibilities of higher speeds have not yet been exhausted.

Turbotrains. In this respect, turbotrains are of great interest. An experimental turbo-jet vehicle was developed in Britain and ran at 150 mph. The experiments with the turbo-jet vehicles proved successful and it was decided to develop a practical model of the train. The turbotrain being developed in this country will have two or more power cars containing the propulsion gas-
turbine. The total weight of the train is to be only half that of a conventional train of the same length because of the light power units and aluminium construction. Were it necessary, it could be fitted with electric motors instead of gas turbines for working on electrified lines.

Air-suspension vehicles. Of all the ideas put forward for new forms of high-speed ground transport, contactless systems or as they are called suspension type systems seem most promising. These contactless systems can be divided into two principal types: the air-cushion system and the magnetic suspension system. Both of them have one feature in common: there is a thin layer (or a cushion) of air between the car and the track, i.e. there is no contact between them. As to the cushion of air it can be provided either by jet engines or by powerful magnets.

The investigations in these systems were taking place in Britain, Japan, Russia, the USA and Canada. France has succeeded in creating the first practical version of train riding on a cushion of air. In spite of the French experience being a success, specialists don't believe that air suspended vehicles are technically and economically acceptable. In addition, the vehicles are too noisy in operation and produce exhaust gases. In this respect the magnetic suspension system seems to be advantageous.

In this system a vehicle is suspended a few centimeters above the track by means of very powerful magnets and propelled by electric motors. Were it necessary, the vehicles could be magnetically suspended below the overhead track. There being no metal friction, very little power would be required for propulsion.

The development of the magnetic suspension is going fast. Japanese National Railways carried out test runs with an experimental vehicle. Propulsion was provided by means of a highly efficient linear induction motor (LIM). This is a special type of electric motor laid out flat. The static part of the motor is installed under the vehicles and produces a magnetic field horizontally instead of running round a circle. The «rotor» part is made in the form of a steel or aluminium rail extended along the whole track. The advantages of this motor are silent operation and elimination of exhaust gases. The LIM is extremely promising for trains riding at speeds greater than 240 mph.

Words to be remembered

1. jet engine
2. power car
3. exhaust gases
4. LIM

реактивный двигатель
wagon s silovoy ustanovkoy
выхлопные газы
линейный асинхронный двигатель
5. laid out flat  развёрнутый
6. propulsion  движущая сила, движение
7. cushion  подушка, упругое основание
8. friction  трение
9. suspension  подвешивание, подвеска
10. silent  бесшумный
11. extremely  чрезвычайно
12. mph  miles per hour (милля в час)

Words to be reviewed
Speed, mass transportation, to meet the requirements, vehicle, successful, conventional, track, powerful, advantage, overhead track, elimination, efficient.


Exercises
I. Translate the Conditional sentences according to the model:
a) If the train speed were 300 kph, passengers would spend only 2 hours to get from Moscow to Petersburg.
b) Were the train speed 300 kph passengers would spend only 2 hours to get from Moscow to Petersburg.

Если бы скорость поезда была 300 км в час, пассажиры затратили бы всего 2 часа, чтобы добраться от Москвы до Петербурга.
1. If there were no friction, the trains would develop enormous speeds.
2. Were all the railways of the world stretched into one line, the total length of the line would amount to $2^{1/2}$ (two and a half) distance from the Earth to the Moon.
3. Were the existing track and rolling stock radically improved, the speed on railways would increase up to 250 kph.
4. If the internal combustion engine had not been invented, we should not have had wonderful locomotives, automobiles and airplanes of these days.
5. Had the possibilities of steam locomotives not been exhausted, they would not have been replaced by electrics and diesels.
6. Had the specialists found completely reliable means of protecting a locomotive crew from radiation, the atomic locomotives would have already appeared on our railways.

II. Translate the conditional sentences:
a) e.g. Should the oil pressure fall to a definite point the system is immediately shut down (Если давление масла падает до определенной точки, то система немедленно отключается).
1. The automatic device reduces the train speed should the car wheels start to slide on the rails.
2. Should the temperature of the cooling water rise too high, the engine is shut down.
3. It is common to have automatic device to give a warning should the journal box become overheated.
4. Should the temperature reach a dangerous level, a signal lamp flashes on the panel.
5. Should the train pass the red signal for any reason, the special device installed in the locomotive cab will stop the train without the action of the driver.

III. Three types of conditional sentences are given below. Translate them and add two more types to each sentence:

I) 1. If they receive all the necessary information, the experimental data will be obtained in time. 2. Unless you come today, I shall fail to prepare the report without your help. 3. We shall carry out our plans in time, provided the failure of the experimental equipment does not occur. 4. In case you are interested in the design of that machine, you will get all the necessary information in that reference book.

II) 1. If the speed of the train were 120 km/h, it would cover the distance in 4 hours. 2. If the driver were more skillful, the accidents would not happen. Were I in his place, I should go on with the experiment. 4. Unless the freight were sent on Monday, they would not receive it in time.

III) 1. If we had known the reason of the trouble, we should have repaired the engine ourselves. 2. Had we known the design of the tube, he would have repaired it himself. 3. If this new method had been applied, you would have got good results a month ago.

IV. Read and translate Part I of the text and choose the right answers:

1. What problem can't modern technology solve?
   a) the problem of photographing Mars and Venus?
   b) the problem of fast passenger transport?
   c) the problem of comfortable travel?

2. Why does high-speed ground transport attract the attention of railway specialists?
   a) because record runs have been made.
   b) because passengers are interested in high-speed journeys.
   c) because record speeds have been reached.

3. Why was it decided to create a practical model of a turbobrain?
   a) because the tests of the experimental turbo-jet train were successful.
   b) because of the speed of the model turbo-jet train.
   c) because the model train was not heavy.
V. Define the function of the verb «to be» in the sentence:
The total weight of the turbotrain is to be only half that of a conventional train of the same length.

VI. Make up disjunctive questions to the following sentences:
1. Speed plays a dominant role for any passenger transport system.
2. At different periods of railway history record runs have been made.
3. An experimental turbo-jet vehicle was developed in Britain.
4. It was decided to develop a practical model of the train.
5. The experiments with the turbo-jet vehicle proved successful.
6. These contactless systems can be divided into two principal types.
7. The magnetic suspension system seems to be advantageous.
8. The development of the magnetic suspension is going fast.
9. Railways carried out test runs with an experimental vehicle.

V. Define the function of the Participle I and translate the following sentences:
1. The electronic computers being used are still too big and slow.
2. Being provided with cash-boxes, the tram-cars are operated without conductors.
3. With the fuel being burnt inside the cylinders the engine has an increased efficiency.
4. Being unloaded, some of the equipment was damaged.
5. The railway being electrified will connect two large industrial cities.
6. Being electrified, the railway will have a higher density of traffic.
7. The turbotrain being developed in this country will have two or more powerful cars containing the propulsion gas-turbine.
8. France has succeeded in creating the first practical version of train riding on a cushion of air.
9. There being no metal friction, very little power would be required for propulsion.
10. The static part produces a magnetic field horizontally instead of running round a circle.

VI. Read Part II of the text and say if the following statements are right or not:
1. The air-cushioned and magnet suspension vehicles are the main types of the air-suspended systems.
2. It is Japan that has built the first air-cushioned train.
3. In the magnetic suspension system very powerful magnets keep a vehicle a few centimeters above the track.
4. To reduce noise and air pollution the Japanese National Railways are de-
developing a high efficient linear induction motor.
5. Specialists consider air-suspended vehicles technically and economically advantageous.

VII. Write out from the text all Conditional sentences and define their type.

VIII. Translate paragraphs 8, 9 in writing.

IX. Make up a plan of the text.

X. Translate the sentences into English:
1. Учёные до сих пор не могут решить проблему наземного высокоскоростного транспорта.
2. Новые типы поездов будут отвечать всем современным требованиям.
3. Поезд с новым типом движущей силы привлекают внимание железнодорожных специалистов.
4. Возможности уменьшения веса поездов на воздушной и магнитной подушках ещё не исчерпаны.
5. Линейный асинхронный двигатель – перспективен.
6. Некоторые страны создали бесшумные поезда.
7. Турбореактивный поезд может достигать скорость на ровном участке до 170 миль в час, он является чрезвычайно перспективным.
8. Движение вперёд обеспечивается с помощью высокоэффективного линейного асинхронного двигателя.
9. Преимущества этого двигателя – бесшумная работа и небольшое количество выхлопных газов.

XI. Answer the questions:
1. What do the record runs and record speeds show?
2. What means of propulsion allows the turbotrain to attain high speeds?
3. Could the turbotrain use electric motors?
4. Why can air-cushioned vehicles attain high speeds?
5. Why is magnetic suspension system more promising as compared with the air-cushion system?
6. What are the two types of magnetic suspension?
7. What was the linear induction motor used for?
8. What are the characteristics of LIM?
9. Why is LIM promising?

XII. Give a technical description of:
a) turbotrains; b) the air-cushion system and the magnetic suspension system.
Magnetic levitation (maglev)

Magnetic levitation is support and often propulsion of objects or vehicles by magnetic fields. Magnetic levitation suspends an object free of contact with any surface, making it particularly appropriate for high-speed (275–300 mph / 435–475 kph) transportation, where it greatly reduces friction and allows for fast, quiet operation. In a typical maglev train, the vehicle, which resembles a railroad or monorail car, travels along a guideway. Lifting force is produced by arrays of electromagnets in both the train and guideway. In one version, magnets of like polarity repel each other to lift the train and guideway; in another, magnets of opposite polarity attract the part of the car suspended below the guideway up toward the guideway, raising the rest of the car above it. Continuously changing the polarity of alternate magnets along the guideway generates a series of attractions and repulsions that moves the train. The enormous amount of electrical power needed by a maglev train is an obstacle to its wide use, but the use of super-conducting magnets reduces energy needs. First proposed in 1909 by Robert Goddard, maglev trains have been the subject of research since the 1960s in the USA, Britain, Japan, Germany, and South Korea. Japan has begun construction on the first leg of a Tokyo – Osaka maglev line, and the German parliament has approved construction of a Berlin – Hamburg line.

XIV. Tell if the information in these sentences is true, false or not in the text:

1. The Maglev train cannot take heavy things.
2. The Maglev train can only go on straight rails.
3. The train makes a lot of noise.
4. There is a Maglev train in Japan.
5. The biggest problem for the Maglev train is that it is too expensive. It is possible to use the Maglev train everywhere.
6. The train cannot work when it is raining.

The flying train

One of the most exciting new types of trains is the Maglev train. The Maglev train is very different from normal trains. It uses magnetic levitation to float on the rail. It can travel very fast – over 500 kilometers an hour. It is very quiet and it is very clean. It doesn't
have any wheels or any parts that move.

**How does it work?**

The secret is that it uses magnets in a new type of motor. Have you ever tried to push two magnets together? If you hold them one way, they attract each other. If you hold them the other way, they repel each other. The Maglev train uses magnets in the same way. The motor is a very big electromagnet. (An electromagnet is a magnet that only works when there is electricity.) The electricity changes direction all the time and the magnet changes from North to South, South to North. There are more electromagnets on the rail and this pushes the train forward.

**Why don’t we see the Maglev train now?**

The train is fast, quite and clean. Why don’t we see it everywhere now? Part of the answer is that the train can only take people. It cannot carry very heavy things. Also, because it goes fast, the rail must be very straight. This makes it difficult to use it in places where there are a lot of hills. But the real answer is because it is very expensive to built. A long rail of electromagnets costs a lot of money. It also uses a lot of electricity. We need to find a cheaper, cleaner way to make electricity if we want to use «The flying train» in our towns and cities.

**XV. Reproduce the dialogue:**

- What big stations will our train pass through?
- We’ll pass through Smolensk, Minsk, Brest.
- What’s next stop?
- Orsha is.
- Could you tell me how long the train stops in Minsk?
- Ten minutes or so.
- What a pity! I’d like to see Minsk.
- You may interrupt your trip, if you like.
- I’m sorry. I can’t. I’m pressed for time.

**XVI. 😊 For fun:**

**Be careful**

The chemistry professor wrote the formula HNO₃ on the blackboard. Addressing one of the students he said:

«Identify that formula, please».

«Just a moment», answered the student, «I’ve got it on the tip of my tongue¹, sir».

«Then», said the professor softly, «you’d better ² spit it out. It is nitro ac-

id².»
Unit 13

Some more information about HSLT

It has been a long time since train speeds first surpassed the 100 km per hour limit and they are now approaching 200 km per hour and even higher in some countries. Scientists and engineers have come to the conclusion that a new leap in the velocity is possible only if the wheel is replaced with an air or magnetic cushion. They believe that it will be possible to develop ecologically clean, noiseless and efficient high speed land transport (HSLT). These express- es will be able to travel at speeds of up to 500 kph and they will replace railway trains on long-distance routes and airplanes on distances of up to 2000 km. The cost of building the next type of transport will be refunded nearly three times as quickly as the cost of building railways.

A large research program has been completed by our specialists. They had to determine the sections for HSLT use, to develop and study magnetic suspension systems, the linear traction motors, systems of service and emergency braking and for protecting the passengers from the influence of strong magnetic fields. According to specialists the most realistic system would be the magnetic suspension system in which electromagnetic attraction forces would «lift» the vehicle 10–15 mm above supply necessary traction.

Many experiments have been carried out by different groups of specialists in which vehicle creates a running magnetic field, directed along the aluminium reaction strip placed between the tracks. Four vertical and four horizontal electric magnets will secure the suspension and stabilization of the vehicle. A special control system automatically ensures a 15 mm gap between the vehicle and the track. Very little effort is required to start the machine.

The advantages of high-speed ground transport over the existing types are obvious. It was estimated that air and road transport burn three fourths of all produced fuels, and the combustion process, naturally, affects the Earth’s ecology. Moreover, airfields and motor roads occupy thousands of hectares of fertile land. In Russia magnetic suspension trains are not yet in operation. Institutes have been conducting successful research connected with this problem.
Words to be remembered

1. to surpass = превышать
2. to approach = to reach = прийти = достигать
3. leap = прыжок, скачок
4. to come to the conclusion = прийти к заключению
5. velocity = speed = скорость
6. magnetic cushion = магнитная подушка
7. to replace = заменять
8. to refund = возмещать расходы
9. to determine = определять
10. emergency braking suspension = аварийное тормозное подвешивание
11. influence = влияние
12. strip = полоса, лента
13. to ensure = обеспечивать
14. gap = зазор
15. effort = усилие
16. obvious = очевидный
17. to estimate = подсчитывать
18. fertile = плодородный

Words to be reviewed

Possible, to develop, noiseless, to travel, long-distance, quickly, research, to complete, traction motor, service, field, advantage, combustion.

Grammar: 1) Tense and Voice (revision).

Exercises

I. a) Translate these words:
Limit, population, tempo, magnetic, ecologically, transport, distance, type, program, section, motors, realistic, system, electromagnetic, linear, experiments, aluminium, vertical, horizontal, electric magnets, stabilization, control, automatically, to start, process, ecology, occupy, hectares.
b) Ask your fellow students to find sentences with the words mentioned above and translate them.

II. a) Define Tense and Voice of the underlined predicates. Make up disjunctive questions to these sentences:
1. A large research program has been completed by our scientists.
2. Many experiments were carried out by our specialists.
3. Successful research will be conducted by some institutes.
b) Change sentences from Active into Passive:
1. The vehicle creates a running magnetic field.
2. Four electric magnets will secure the suspension and stabilization of the vehicle.
3. Some institutes have conducted successful research on this problem
4. The linear motor would supply necessary traction.
5. They had to determine the sections for HSLT use.

III. Make up sentences:
1) trains, be, ecologically, should, future, the, clean, and, noiseless.
2) is, speed, a, higher, because of, impossible, the, of, track, the, of, shortness.
3) growth, population, mobility, its, tempo, of, the, life, requires, speeds, greater, transport, ground, from.
4) it, not, is to, increase, possible, wheel, traditional, the, of, help, the, with, the speed.

IV. Define the type of the question:
1. Is it possible to increase the speed with the help of the traditional wheel?
2. Trains are approaching 200 km per hour, aren’t they?
3. Was it impossible because of the length of the track?
4. Do trains reach 200 km per hour or higher?
5. Why is the weight of the rolling stock an important factor?

V. Correct the mistakes:
1. It have been a long time…
2. Population growth require greater speeds.
3. Scientists comes to the conclusion.
4. A new leap in velocity are possible if the wheels is replaced with magnetic cushion.
5. It easy to imagine…
6. The future trains should ecologically clean and noiseless.
7. The results of the tests will become the foundation for developed a full-size experimental vehicle.

VI. Find in the text 2 sentences with the equivalents of the modal verbs and translate them.

VII. What is in your opinion the main sentence in the text? Prove it.

VIII. Translate the following questions and ask your fellow students to answer them:
1. К какому заключению пришли ученые и инженеры?
2. Что они предлагают?
XI. Look at the information about the Channel Tunnel. Find answers to these questions:
1. How many train tunnels are there?
2. Is the tunnel in the sea or under the sea?
3. How long did it take to build it?
4. Where are the drills now?

The story of the channel

On Friday 6 May 1994, Queen Elizabeth II of Britain and President Mitterrand of France traveled ceremonially under the sea that separates their two countries and opened the Channel tunnel (often known as 'the Chunnel') between Calais and Folkston. For the first time ever, people were able to travel between Britain and the continent without taking their feet off solid ground.
The Chunnel was by far the biggest building project in which Britain was involved in the twentieth century. The history of this project, however, was not a happy one. Several workers were killed during construction, the price of construction turned out to be more than double the 14.5 billion first estimated and the start of regular services was repeatedly postponed, the last time even after tickets had gone on sale. On top of all that, the public showed little enthusiasm. On the day that tickets went on sale, only 138 were sold in Britain (and in France, only 12!). On the next day, an informal telephone poll found that only 5% of those calling said that they would use the Chunnel.

There were several reasons for this lack of enthusiasm. At first the Chunnel was open only to those with private transport. For them, the small saving in travel time did not compensate for the comparative discomfort of traveling on a train with no windows and no facilities other than toilets on board, especially as the competing ferry companies had made their ships cleaner and more luxurious. In addition, some people felt it was unnatural and frightening to travel under all that water. There were also fears about terrorist attacks. However unrealistic such fears were, they certainly interested Hollywood. Every major studio was soon planning a Chunnel disaster movie!

At the time of writing, the public attitude is becoming more positive, although very slowly. The direct train services between Paris and London and Brussels and London seem to offer a significant reduction of travel time when compared to travel over the sea and this enterprise has been more of a success. It will not be until the next century, however, that there is a high-speed train to take passengers between the British end of the Chunnel and London.

XII. Not everyone in Britain is happy about the Channel tunnel. Read what some people say about the tunnel. Do they think it is a good or a bad thing?

1. Millions of rats will run down the tunnel and bring diseases that we don’t have here. 2. This tunnel is fantastic. It means that we can now get to France much quicker. It is going to be excellent for business. 3. Why do we want a channel? The tunnel is going to change our traditional way of life. We are not an island any more. 4. The tunnel saves a lot of time and I can do my work on the train. Before, it took hours and hours by plane or boat. 5. I think it’s great. I hate traveling by sea. I always feel seasick. Now, with the tunnel, I can travel by train.

XIII. In summer you will be able to do practical work. This Sample of Cover letter will help you to find a job:
Dear Mr. Petrov:

I am a first-year student in the M.B.A. program at the Wharton Business School in Philadelphia.

I understand that you are heading the independent Russian airline. I have heard from my friend Mr. Bill Eastmann, a student at Duke University’s Fuqua School of Business that you might wish to have an American M.B.A. student work with this summer as an intern. I am very interested in the possibility of such an internship during the summer of 2014.

My professional experience has given me an in-depth knowledge of the air transportation industry. I have, in particular, worked for American Airlines. My responsibilities included the study of schedules, fares, equipment selection, and financial results. Notably, I prepared numerous feasibility studies for both jet and turboprop routes, including passenger and pure cargo service.

I wish to place this experience at the disposal of your airline. I believe strongly that my knowledge of the deregulated air transportation industry in the United States could be quite beneficial to your carrier.

I have enclosed a copy of my resume. If my background and qualifications are of interest to you, please telephone me at (215) 748 - 3037. I would be interested in meeting with you in mid-April in New York to discuss further the possibility of such a summer position, and your requirements.

Sincerely, Mark Diamond.

XIV. To find a good job one has to write a resume. Here is an example of such a resume:

<table>
<thead>
<tr>
<th>1. NAME/SURNAME</th>
<th>Mariana Smirnova</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. AGE</td>
<td>14 October, 1974</td>
</tr>
<tr>
<td>3. MARITAL STATUS</td>
<td>single</td>
</tr>
<tr>
<td>4. CONTACT TELEPHONE</td>
<td>4127081</td>
</tr>
<tr>
<td>5. LANGUAGES</td>
<td>English (fluent) – translating, interpreting and negotiating skills, German (basic)</td>
</tr>
<tr>
<td>6. EDUCATION</td>
<td>A fourth-year student at the evening department of the Institute of Foreign relations (MGIMO), International Economy</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Typing and computer courses</td>
<td>1994–1995</td>
</tr>
<tr>
<td>Interpreting courses</td>
<td></td>
</tr>
<tr>
<td>Assistant General Director</td>
<td></td>
</tr>
<tr>
<td>1995 – MADI Institute (Automobile Institute, Economics department)</td>
<td></td>
</tr>
<tr>
<td>Translator/Interpreter, Office Assistant</td>
<td></td>
</tr>
<tr>
<td>9. SALARY HISTORY</td>
<td>$700 per month including lunch</td>
</tr>
<tr>
<td>10. COMPUTER SKILLS</td>
<td>Word for Windows, EXCEL, Norton Commander</td>
</tr>
<tr>
<td>11. PREVIOUS EXPERIENCE</td>
<td>1. Oral and written translation</td>
</tr>
<tr>
<td></td>
<td>2. Travel arrangement</td>
</tr>
<tr>
<td></td>
<td>3. Meetings and negotiations arrangement</td>
</tr>
<tr>
<td></td>
<td>4. Business letters and contracts making</td>
</tr>
<tr>
<td></td>
<td>5. Coring out administrative duties about the office</td>
</tr>
<tr>
<td></td>
<td>6. Working with clients, marketing experience</td>
</tr>
<tr>
<td>12. INTERPERSONAL QUALITIES</td>
<td>Good communication skills, energetic, well-organized, flexible, friendly, honest, responsible, intelligent</td>
</tr>
</tbody>
</table>

**XV. Remember DOs and DON’Ts for job seekers.**

| DO learn ahead of time about the company and its product. Do your homework. | Предварительно получите информацию о фирме и ее специализации. Это будет ваше домашнее задание. |
| Do apply for a job in person. | Обращайтесь за работой лично. |
| Do stress your qualification for the job opening. | Подчеркивайте, что вы имеете квалификацию, необходимую для данной работы. |
| Do assume an air of confidence. | Предполагайте атмосферу доверия. |
| Do approach the employer with respectful dignity. | Обращайтесь к работодателю с уважительным достоинством. |
**XVI. Ann goes to the ticket office. Put the lines if the conversation in the correct order:**
1. A: Hello. I’d like a ticket to Newcastle, please.

<table>
<thead>
<tr>
<th>English</th>
<th>Russian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do try to be optimistic in your attitude.</td>
<td>Старайтесь быть оптимистом.</td>
</tr>
<tr>
<td>Do maintain your poise and self control.</td>
<td>Проявляйте выдержку и контролируйте себя.</td>
</tr>
<tr>
<td>Do try to overcome nervousness and shortness of breath.</td>
<td>Не нервничайте и говорите спокойно.</td>
</tr>
<tr>
<td>Do answer questions honestly and with straightforwardness.</td>
<td>Отвечайте на вопросы честно и прямо.</td>
</tr>
<tr>
<td>Do have a good resume.</td>
<td>Имейте при себе хорошее резюме.</td>
</tr>
<tr>
<td>Do recognize your limitations.</td>
<td>Признавайте свои недостатки.</td>
</tr>
<tr>
<td>Do make plenty of applications.</td>
<td>Делайте много запросов.</td>
</tr>
<tr>
<td>Do indicate your flexibility and readiness to learn.</td>
<td>Подчеркните вашу гибкость и готовность учиться.</td>
</tr>
<tr>
<td>DON’T apologize for your age.</td>
<td>НЕ извиняйтесь за свой возраст.</td>
</tr>
<tr>
<td>DON’T be untidy in appearance.</td>
<td>НЕ производите впечатление неряшливого человека.</td>
</tr>
<tr>
<td>DON’T express your ideas on compensation, hours, etc. early in the interview.</td>
<td>НЕ затрагивайте вопросы относительно зарплаты, рабочего времени и т. д. в начале разговора.</td>
</tr>
<tr>
<td>DON’T hesitate to fill out applications, give references.</td>
<td>НЕ колеблясь, заполняйте анкеты, предоставляйте отзывы.</td>
</tr>
<tr>
<td>DON’T hang around, prolonging the interview, when it should be over.</td>
<td>НЕ затягивайте интервью искусственно, когда оно должно закончиться.</td>
</tr>
<tr>
<td>DON’T go to an interview without a record of your former work connection.</td>
<td>Не приходите на собеседование без рекомендаций с предыдущих мест работы.</td>
</tr>
<tr>
<td>DON’T arrive late and breathless for an interview.</td>
<td>Не приходите на интервью поздно и запыхавшись.</td>
</tr>
<tr>
<td>DON’T be a «know it all» or a person who can’t take instructions.</td>
<td>НЕ будьте «всезнайкой» или человеком, который не признает советов.</td>
</tr>
<tr>
<td>DON’T isolate yourself from contacts that might help you to find a job.</td>
<td>НЕ избегайте контактов, которые могли бы помочь вам найти работу.</td>
</tr>
<tr>
<td>DON’T feel that the world owes you for a living.</td>
<td>НЕ считайте, что весь мир несет за вас ответственность.</td>
</tr>
<tr>
<td>DON’T make claims if you cannot «deliver» on the job.</td>
<td>НЕ жалуйтесь, если Вам не удалось «завоевать» работу.</td>
</tr>
<tr>
<td>DON’T display a feeling of inferiority.</td>
<td>НЕ демонстрируйте чувство приниженностии.</td>
</tr>
</tbody>
</table>
2. A: I want to come back this evening, so a day return.
3. C: How do you want to pay?
4. A: Return, please.
5. C: Here's your change and your ticket.
6. C: Single or return?
7. A: Twenty, forty, sixty pounds.
8. A: Day return or period return?
10. C: Forty-eight pounds fifty, please.
11. A: Thank you.

XVII. 😊 For fun:

Two women in a train argued concerning the window and at last one called the conductor. «If this window is open», she declared, «I shall catch cold and die».

«If the window is shut», declared the other, «I shall suffocate». The two glared at each other. The conductor was at a loss, and welcomed the advice of a man who sat near. «First open the window», the man suggested, «that will kill one. Then shut the window: that will kill the other. Then we’ll have peace».

Notes:
1. shut – закрытый
2. to declare – объявлять, провозглашать
3. to suffocate – задыхаться, душить
4. to glare – посмотреть с ненавистью, посмотреть гневно

Have you ever been in similar situation?
II. GRAMMAR EXERCISES

№ 1

1. With the fuel being burnt inside the cylinders, the engine has an increased efficiency. 2. After the test runs the locomotive was found to have some serious drawbacks in its design. 3. The data to be obtained in the course of the experimental runs are to be used later for improving the passenger rolling stock. 4. Today, signalling, brakes and track are all being improved at the same time as the motive power. 5. The tunnel had to be built some years ago. 6. Many problems of maintenance and safety are to be solved. 7. Super-high speeds were not heard of many years ago. 8. The railway being electrified will connect two large industrial cities. 9. The locomotives hauling trains on mountainous railway usually operate on electric energy. 10. Having demonstrated his locomotive the inventor was asked a large number of questions. 11. Being unloaded, some of the equipment was damaged. 12. The first freight cars were followed by platform cars. 13. The locomotive drivers expect remote control to find application for operating industrial locomotives. 14. Processing the data the computer doesn't make errors. 15. The very first freight cars are known to have been used in coal mines in England. 16. Having been tested, the electrified line was opened for public service. 17. Goods were to be loaded in containers and carried on specially-built multiple-unit trains. 18. Had they received all the necessary information, the experiment data would have been obtained in time. 19. The railway constructed carried a large volume of traffic. 20. There will have to be a considerable rebuilding of main lines. 21. The traffic was stopped because of the power supply system having been damaged. 22. Less personnel is required in case of substations being operated by remote control. 23. Mounted on a frame is a generator which produces electric current to drive traction motors. 24. At automated power plants a warning device gives a sound signal should any fault occur.

№ 2

1. The very first freight cars were pulled by horses along wooden rails. 2. Having applied the radio and telephone for sorting trains the railways improved the turnover of railway cars. 3. Despite its high speed the gas-turbine locomotive is unlikely to find a wide application because of producing much smoke and noise. 4. The equipment tested proved reliable in operation. 5. Railways are expected to compete with other modes of transport. 6. There had to be much experimentation before some of the problems of construction and operation could be solved. 7. The original signalling system is soon to be replaced with solid state interlocking. 8. Burning organic fuel the thermal power stations cause air pollution. 9. One of the most important railroad inventions
is sure to be a sleeping car. 10. The newly designed locomotive is intended for passenger service. 11. Many innovations have been introduced in car construction. 12. To remain a vital means of communication the railway will have to increase its speed. 13. The world learnt a record speed to have been attained by the electric locomotive. 14. Experts believe the Atom-power plants to compete successfully with the conventional power stations. 15. Having been introduced on railways, electric traction provided higher speeds. 16. Had the driver been more skillful, the accident wouldn't have happened. 17. The passengers waiting for the train could watch the track being renewed. 18. Were longer rails used everywhere, the comfort of passengers would be increased. 19. The computer made the plan of the station's work, having processed the data on the freight trains. 20. The higher efficiency of fluorescent tubes has resulted in their being widely applied to lighting carriages. 21. Our having solved that complicated problem is due to the high speed electronic computer being used. 22. I was told of the machine having been repaired. 23. Connected to the water tank is a small water pump which is to add water to the engine cooling system.
III. GRAMMAR TEST

1. Active or passive? Choose the correct verb form.
1. The book (wrote/was written) by Hardy.
2. Four people (have killed/have been killed) in a train crash.
3. A famous architect (was built/built) the bridge.
4. The house (bought/was bought) by a pop star.
5. Local police (have been arrested/have arrested) the bank robber.
6. I (arrived/was arrived) last Friday.
7. The room (will clean/will be cleaned) later.
8. «Did you go to the party?» «No, I (didn't invite/ wasn't invited)».
9. It's a big company. It (is employed/employs) two hundred people.
10. Tom (has lost/has been lost) his key.
11. Many accidents (caused/are caused) by dangerous driving.
12. A cinema is a place where films (show/are shown).
13. People (aren't used/don't use) this road very often.
14. This house (built/was built) in 1930.
15. This situation is serious. Something must (do/be done) before it's too late.
16. My car (has disappeared/has been disappeared).
17. Have you heard the news? The President (has shot/ has been shot)!
18. A new supermarket (will be built/will built) next year.
19. (in a shop) «Can I help you, madam?» «No, thank you. I (am serving/am being served)».
20. When I came to the party, John (had already been gone/had already gone) home.

2. Глагол «to have» выражает долженствование в предложении:

a) Railways have introduced a new type of freight car for transporting cement.
b) Today, more powerful machines have to be developed to speed up the process of building railroads.
c) Powerful machines have been developed for building railroads.
d) Horses had been used as tractive power long before the steam locomotive was invented.
e) More powerful locomotives had to be used to draw long trains.
f) Before the steam locomotive began to run on railways the passengers had travelled in carriages drawn by horses.

3. Выберите правильный вспомогательный глагол:

1. Goods were to be loaded in containers. What … goods to be loaded in?
   a) did    d) do
   b) is     e) were
   c) was    f) am
2. The speeds on railways have increased so greatly. Where … the speeds increased so greatly?
   a) has   d) was
   b) were   e) does
   d) have

3. Motor cars, planes and locomotives pollute the air. … motor cars, planes and locomotives pollute the air?
   a) is   d) do
   b) were   e) did
   c) have   f) are

4. The first industrial robots appeared in our country more than a decade ago. When … the first industrial robots appear in our country?
   a) was   d) do  g) have
   b) am   e) were
   c) does   f) did

4. Причастие II built отвечает на вопрос «какой» в предложении

1. Some of the houses have been built by these engineers.
2. This car is being built at our plant.
3. The railway built connected Moscow with the Far East.
4. The locomotive is to be built in the shortest time possible.
5. Most modern cars are built at the car building plants.

5. Английскому предложению соответствует:

1. I want the students to describe this picture.
   a) Я хочу описать эту картину студентам.
   b) Я хочу, чтобы студенты описали эту картину.
   c) Я хочу, чтобы студентам описали эту картину.

2. The writer is reported to have published his new book.
   a) Писатель сообщил, что он опубликовал свою новую книгу.
   b) Сообщают, что писатель должен опубликовать свою новую книгу.
   c) Сообщают, что писатель опубликовал свою новую книгу.

3. I’ve got a lot of things to do.
   a) Я сделал много.
   b) Мне нужно многое сделать.
   c) У меня столько дел, что я без сил.

4. She didn’t appear to have heard the report.
   a) Она не появилась на докладе и не слышала его.
   b) Ей кажется, что она не слышала этого доклада.
   c) Кажется, она не слышала доклада.
IV. TEXTS FOR VIEWING READING

High speed to Alacant

SPAIN: Passenger services on the 165 km Albacete – Alacant high speed line began on June 18, 2013, the day after it was officially opened by the Prince of Asturias. The €1·92bn line has cut the fastest Madrid – Alacant journey time by 50 min to 20 h 20 min, and a further reduction to 2 h 5 min is expected once work to commission ETCS Level 2 signalling is completed and the maximum speed can be raised to 300 km/h.

RENFE operates 18 services a day between Madrid and Alacant, using Class 112 trainsets and refurbished Class 100 units built for Spain’s first high speed line which opened between Madrid and Sevilla in 1992. There are also daily Alvia services from Alacant to Santander and Gijon operated with gauge-changing Class 130 trainsets, as well as a service to Vigo operated at weekends and other peak periods using Class 730 electro-diesel trainsets.

Capacity on the Madrid – Alacant route has been increased from 4800 to over 6300 seats a day. According to Development Minister Ana Pastor, a total of 69 681 tickets were sold on the route between June 10 and 17, up 42 % on the year before.

Across the Spanish high speed network, which at 3 100 km the Ministry of Development says is now the world’s second-largest after China, between February 8 and June 2 ticket sales were up 18 % and passenger-journeys up 14 % on the year before. This follows the introduction of a market-based fares structure, which according to the ministry has returned high speed passenger traffic to growth and increased average train occupancy to 75 %.

Moscow – Kazan first, says RZD

RUSSIA: An 803 km Moscow – Vladimir – Nizhny Novgorod – Kazan route should form the first stage of a high speed rail programme, Russian Railways President Vladimir Yakunin told President Putin and other guests at recent conference held to discuss the prospects for developing dedicated high speed lines. Three corridors are under consideration, running from the capital to Kazan, to St. Petersburg and to Sochi and Adler via Rostov-na-Donu.

The proposed line would cut Moscow – Kazan journey times from more than 13 h to 3½ h, while Nizhniy Novgorod – Kazan timings would be reduced from 10 h 32 min to 1 h 37 min.

The cost of the line is up to 928bn roubles, and Yakunin said that international experience and economic modeling suggest that the most effective way of taking forward development would be though a PPP, with the state investing 70 % and the private sector 30 %. Potential sources of finance include pension
funds, the state Russian Direct Investment Fund, the Ministry of Finance’s pension investor Russian National Wealth Fund and infrastructure bonds.

Yakunin said high speed rail projects would require skilled staff and complex equipment, and there would be a need to develop domestic infrastructure and rolling stock capabilities. A working group is to be established to priorities, the routes to be developed, define implementation and financial strategies and allocate funds for feasibility studies, which regional governments are to be asked to support.

How fast is fast enough?

In the two years that have passed since our last survey, the world’s high speed networks have continued to grow apace. However, dedicated high speed lines are still largely limited to Europe and the Far East. In today’s terms, there are no services that could really be regarded as ‘high speed’ in the Americas, South Asia, Africa or Australasia. In all of these regions, the conventional view has been that the distances between major population centres are too great for rail to compete with air, although recent developments suggest that the Chinese may be rewriting the rules, offering journey times of 8 h or more and operating high speed trains with sleeping cars on the longest routes. The USA seems committed to high speed development in California and the Northeast Corridor, but if the goalposts continue to move in terms of acceptable journey times, high speed rail begins to look achievable in 1 500 km corridors like New York – Chicago.

The average speed of trains rose steadily throughout the last century, from 100 km/h around 1900 to the 115 km/h of the Cheltenham Flyer in the 1930s. The baton briefly passed to diesel trains such as Germany’s Fliegende Hamburger and the Burlington Zephyr in the USA, but after the Second World War electric traction took the lead and it has stayed that way ever since. True high speed operations really began with the opening of the Tokaido Shinkansen in 1964, which triggered a step-change. By 2000, maximum speeds of 250 km/h to 300 km/h had become the norm for new lines, but today a growing number of operators are running at 320 km/h and talking about 350 km/h or 360 km/h, with some lines being designed to make provision for speeds of up to 400 km/h in the future.

One factor that cannot be overstated is the difficulty of getting consent in an open democracy to build railways on the scale that we have seen in China. The UK’s battle over High Speed 2, a 540 km Y-shaped line that in some countries could be considered as a short extension, highlights the issue. Building new lines through less densely populated countries present fewer difficulties, as

1 Australasia is the region that consists of Australia, New Zealand, New Guinea, and the neighboring islands of the Pacific Ocean.
exemplified by Spain, but here the challenge is attracting sufficient ridership to justify the investment.

**The best of the best**

Looking at the overall results China, France, Spain, Japan and Taiwan form the ‘champions’ league` with start-to-stop timings at more than 250 km/h. Once again, China dominates the results, less than two decades after it first entered the high speed arena. The extent of high speed train operations in China is truly amazing, given that the country that only appeared in our tables in 1997. The political storm that erupted after the Wenzhou crash in July 2011 seems to have abated, and the average speeds now being scheduled prove that the 300 km/h ceiling imposed in the immediate aftermath has been lifted again.

Just to emphasise the point, China’s fastest trains have an average point-to-point speed more than 40 km/h faster than the best trains in secondplaced France. And it is not just a one-off, either. No fewer than 10 northbound and 12 southbound trains a day are timetabled to cover the 248·0 km between Shaoguan and Leivang Xi in 47 min, at a blistering average of 315·6 km/h.

France retains second place with its large, and very successful, high speed network. There is a little change to the fastest timings, with just the odd minute or two added or removed from runs. The 271·8 km/h sprint on LGV Est between Lorraine TGV and Champagne-Ardenne TGV remains the fastest booked train in Europe. By contrast, TGV 6134 demonstrates how high averages can be achieved over a long distance on dedicated tracks, covering the 730·6 km from Aix-en-Provence TGV to Paris at 257·8 km/h; this must be one of the longest start-to-stop runs in Europe.

In third place, Spain has overtaken Japan in the speed stakes, although in many ways this should not come as a surprise. The Spanish high speed network has several long routes with few intermediate stations. Like Japan, the different gauge means that the high speed lines have to continue right into the major cities, so that there is no slow running over conventional tracks as happens elsewhere. Indeed, it could be argued that the Spanish results are a little conservative, but this may reflect the emphasis that RENFE places on reliability and punctuality, offering guaranteed refunds for late arrivals.

Overall Spanish high speed trains have seen a little tightening of their schedules which has helped them climb up the league table. Although RENFE had been hoping to start running at 350 km/h with the introduction of ETCS Level 2, at present its trains are still limited to 300 km/h. Like France, the fastest service in Spain is a sprint between two intermediate high speed stations – in this case on the Barcelona route. Another echo of the French results is the fast long distance service, in this case Madrid – Barcelona where several AVEs a day are scheduled to cover the 621 km in $2\frac{1}{2}$ hours at an average of 248 km/h.
Although Japan drops to fourth place in the speed league, it would be fair to say there is not a lot to choose between France, Spain and Japan. There has been some speeding up of services since the last review, with East Japan Railway now taking the top slot, thanks to the start of 320 km/h running on the Tohoku Shinkansen. JR East’s Hayabusa trains 4 and 5 have pushed JR Central’s fastest Nozomi services down to third and fourth place. Even the shorter cross-Japan services on the Joetsu Shinkansen get into the table with a non-stop run between Omiya and Niigata at 246 km/h.

The final slot in the «top division» goes to Taiwan, where once again a speeding up of existing trains has pushed THSRC, with 22 trains covering the 179.5 km between Zuoying and Taichung at 256 km/h.

**Rail transport in China**

Rail is the major mode of transport in China. In 2011 China's railways carried 2,947 billion tonne-kilometers of freight and 961,23 billion Passenger-km, both traffic volumes are the highest in the world. The high volume of traffic that China's railway system carries makes it critical to its economy. Carrying some 24 % of the world's railway transport volume on only 6 % of the world's railways, the national rail system is modernizing and expanding rapidly and is efficiently within the limits of all available resources. China has the world's third largest rail network, as of 2010 it is 91,000 km (56,545 mi) long, an increase of some 5,000 km (3,107 mi) of track from 2009. About 47 % of the network is electrified.

In 2011 China's railway inventory included 19,431 locomotives owned by the national railway system. The inventory in recent times included some 100 steam locomotives, but the last such locomotive, built in 1999, is now in service as a tourist attraction while the others have been retired from commercial service. The remaining locomotives are either diesel or electric powered. Another 352 locomotives are owned by local railroads and 604 operated by joint-venture railways. National railway freight cars numbered 622,284 and passenger coaches 52,130.

The high-speed service is mainly operated by China Railway High-speed. As of October 2010, China has 7,000+ km of rail track capable for 250+ km/h running.

The only railway link China has with a neighboring country that does not have a break of gauge is with North Korea. It also has links with Kazakhstan, Mongolia and Russia, which all use the 1,520 mm (4 ft 11 27/32 in) gauge and with Vietnam, where the 1,000 mm (3 ft 3 3/8 in) gauge is still in use.

China does not have a direct rail link with Afghanistan, Bhutan, India, Kyrgyzstan, Nepal, Pakistan or Tajikistan, but is currently planning links with Laos and India (via Burma).
Variable gauge axle trains are sometimes used to overcome the break of gauge with neighboring countries. The mainland is also linked to the Hong Kong, but not with the Macau, which is currently being planned.

![Figure 2. China Railway-HSR and new 200 km/h Railways (Operational, under construction and planned by December, 2013)](image)

(Mapped by the author based on data from Year Book of China Transportation and Communication, China Railway Yearbook, and Planning & Statistics Department of CCR)

Current HSR systems of Taiwan and China

**Public land transportation in France**

Public land transportation is developing in France and throughout the world, with a growing trend toward high-speed cross-border trains, trams and regional trains. Technological innovations are increasing and French expertise, represented to a large extent by the firm Alstom, has a well-established reputation.

Alstom has just launched its AGV (Automotrice à grande vitesse) but is already working on another model of high-speed train. As of yet the project does not have a name, so the press has dubbed it the AGVII. We already know that it will be capable of speeds of 400 km/h (250 miles per hour) and will come in several versions, with one or two decks (duplex) and a freight model. The world leader in high-speed and very high-speed trains has spared no effort in terms of creativity, an essential feature of this ultra-competitive market. «80 % of our research and development is carried out in France, internally and with our suppliers, and represents an investment of €800,000
every day», shared Jérôme Wallut, Managing Director (France) of Alstom Transport. «In this sector, if you’re not moving forwards, you’re going backwards! If we want to carry on being a flag-bearer for exports, innovation is the only viable option»

Alstom’s plans are being closely monitored by Russia, Brazil and the United States, among others. The new AGV will be able to carry more passengers in order to reduce its operating costs. Such is the price of success: some routes are saturated and as it is impossible for trains to get longer (they cannot exceed 202 metres without a knock-on effect on infrastructure, particularly platforms), the only option is to increase their capacity while maintaining levels of comfort. Technical components are therefore optimized to leave as much space as possible for travelers.

The new train will also be completely interoperable. The word may be less than appealing, but it expresses a major shift in transport, symbolized by the recent opening of the Frankfurt/Marseille route, the first long-haul international connection (a seven-hour train journey), which is set to be followed by other destinations throughout Europe. Crossing borders with high-speed trains that are compatible with different power supply, signaling and safety systems is one of Alstom’s unique features.

The other major trend is «trains for day-to-day life» in the words of SNCF’s Chairman and Managing Director Guillaume Pepy. French regional trains operate in Germany, Spain, Italy, Sweden, the United Kingdom and Australia and regional transportation is growing strongly within France itself. Alstom is currently finishing the single-deck Regiolis (ordered in large numbers by the regions), working on seat comfort, lighting, air conditioning, on-board service, passenger information and noise levels – aware that its competitors are not so much other manufacturers as road and air travel!

As far as urban transportation is concerned, Alstom’s underground trains are in service in cities ranging from Singapore to Shanghai and São Paulo, while its trams run in both Ireland and North Africa. Over 1,700 Citadis trams have been sold, half in export markets, and the range has just been presented in Moscow, with contracts for hundreds of cars at stake. French technology and design are proving attractive and people who are less then keen on overhead electric cables will be delighted by the latest major technical innovation: trams equipped with a ground-level power supply.

Trams are also becoming more compact, which reduces the cost of infrastructure, platforms and depots, and makes them suitable for smaller towns. Another area of focus is the design of step-free public transportation which is therefore accessible to everyone. «Towns, regions and national governments give us money and we have an obligation to use it well», explained Jérôme Wallut. «We don’t just deliver trains: we offer a public service». 
Railway in Japan

In Japan, railways are a major means of passenger transportation, especially for mass and high-speed transport between major cities and for commuter transport in metropolitan areas. Seven Japan Railways Group companies, state-owned until 1987, cover most parts of Japan. There also are railway services operated by private rail companies, regional governments, and companies funded by both regional governments and private companies.

Total railways of 27,182 km include several track gauges, the most common of which is 1,067 mm (3 ft 6 in) narrow gauge, with 22,301 km of track of which 15,222 km is electrified. Fukuoka, Kobe, Kyoto, Nagoya, Osaka, Sapporo, Sendai, Tokyo, and Yokohama have subway systems.

Most Japanese people traveled on foot until the later part of the 19th century. The first railway was built between Tokyo and Yokohama in 1872 and many more developed. Japan now has one of the world's most developed transportation networks. Mass transportation is well developed in Japan, but the road system lags behind and is inadequate for the number of cars. Road construction is difficult because of the high areas of population and the limited amount of usable land. Shinkansen are the high-speed trains in Japan and they are known as bullet trains. About 250 Shinkansen trains operate daily. The fastest shinkansen trains are the JR East E5 and E6 series trains, which operate at a maximum speed of 320 km/h (200 mph). Shinkansen trains are known to be very punctual. A train is recorded as late if it does not arrive at the specified time. In 2003, the average delay per train on the Tokaido Shinkansen was 6 seconds.
III. TEXTS FOR ADDITIONAL READING

Half a Gift

I was ten years old then, and my brother Nick was fourteen. For both of us this purchase of a gift for our mother on Mother's Day was an occasion of excitement and great impedance.

Our mother worked from early morning till late at night, cooking, buying, washing and looking after us in illness.
«What are you going to give her» asked Father.
«We're going to give separate presents», I announced importantly.

Nick and I discussed what to buy. We became involved in a competition of taste.
«Let's not tell each other what we're getting», said Nick.

After careful deliberation I bought for my mother a comb decorated with little shiny stones that could even be mistaken for diamonds. Nick came back from the store with a pleased look. He liked my gift very much and wouldn't tell me about his. He only said: «I’ve picked a certain moment when I’ll give my gift».

The next morning Nick kept me close and when my mother got ready to wash the floor he nodded to me and we ran to get our gifts.

When I came back, Mother was, as usual, on her knees, wearily scrubbing the floor. It was the job she hated most in the world.

Then Nick returned with his present, and Mother sat back on her heels, staring unbelievingly at the gift. Her face went pale with disappointment as she looked at the new scrubbing pail with the fresh mop in it.
«A Mother’s Day gift of a scrubbing pail», her voice almost broke.

Tears sprang to Nick’s eyes. Without a word he picked up the scrubbing pail and mop and blindly trudged down the stairs. I put the comb in my pocket and ran after him. He was crying and I felt so bad I began to cry, too.

On the way down we met Father. Nick could not talk, so I explained. «It's a fine gift. A wonderful gift».

We all went upstairs where Mother was still scrubbing the floor. Without a word Father soaked the puddle of dirty water up with the mop and showed us how to use it.
«You didn’t let Nick finish», he said to Mother. «Part of his gift was that he was going to wash the floor from now on». He looked at Nick. «Isn't that so, Nick?»

With a flush of shame Nick understood the lesson. «Yes, yes», he said in a low eager tone.
«Ah, a woman can become so stupid». She kissed Nick and he felt better. Then she turned to me. «What is your gift?» asked Father. Nick looked at me
and paled. I felt the comb in my pocket. The comb with shining stones would make the scrubbing pail, again, just a scrubbing pail.

«Half the scrubbing pail», I said and Nick looked at me with love in his eyes.

(after Robert Zaks).

**How we kept Mother’s Day**

After S. Leacock

We decided to have a special celebration of Mother’s Day. We thought it a fine idea. It made us realize how much Mother had done for years, and all the efforts and sacrifices that she made for our sake.

So we decided that we’d do everything we could to make Mother happy. Father decided to take a holiday from his office and my sister and I stayed home from college and Mary and my brother stayed home from High School.

Our plan was to make the day like a big holiday. So we decided to decorate the house with flowers. We asked Mother to arrange the decoration because she always does it on holidays.

Well, after breakfast we had it arrange as a surprise for Mother that we would hire a motor car and take her for a beautiful drive away into the country. Mother is never able to go to the country because she is busy in the house all the time.

We asked Mother to cut some sandwiches and make up a sort of lunch in case we got hungry. Mother packed it all up in a basket for us ready to go to the car.

When the car came to the door, it turned out that there was no room in it for us all. Father said he could stay at home; he said that there was a lot of work in the garden that he could do. He wanted us to go right ahead and be happy. Of course, we didn’t want to let Father stay at home.

So in the end it was decided that Mother would stay home and have a lovely restful day round the house, and make the dinner. Mother doesn’t like fishing, and also it was a little cold and fresh out of doors and Father was rather afraid that Mother might take cold if she came. We said good-bye to Mother and drove away. Mother stood and watched us as long as she could see us.

We had a very happy day up among the hills. It was quite late when we came back, but Mother had guessed that we would be late, so she kept the dinner so as to have it just nicely ready and hot for us. She had to get up and down a good bit during the meal, fetching things back and forward. The dinner lasted a long while, and when it was over all of us wanted to help to clear the things away and wash the dishes. But Mother said that she would do it herself, and so we let her.
It was quite late when it was all over, and when we all kissed Mother before going to bed she said it had been the most wonderful day in her life, and I think there were tears in her eyes.

Public holidays and celebrations in England

There are few public holidays in England that is days on which people need not go in to work. Christmas, Boxing Day, Easter, Spring Bank Holiday, August Bank Holiday – there the list ends.

Most of these holidays are of religious origin, but for the greater pan of the people they have long lost their religious importance and are simply days, on which people eat, drink, and make merry.

Christmas is the most colourful holiday of the year. An average English family sends many Christmas cards and gives and receives many presents, they are usually very impractical. For people who are well-to-do, it is not a problem, but it is very difficult for families with small budgets.

Boxing Day falls on December 26th. In the old days people gave their servants Christmas boxes, or gifts of money, that's how this holiday got its name. In England the New Year is not as widely observed as Christmas. But people, however, celebrate it in one way or another. The most common type of celebration is a New Year party.

Easter

Easter day is named after the Saxon goddess of spring, Eostre, whose feast look place at the spring equinox. Easter is now the spring feast of the Christian church, commemorating the resurrection of Jesus. It falls on a Sunday between 22 March and 25 April, according to the church calendar.

Traditionally, Easter eggs, dyed and decorated or made of chocolate, are given as presents symbolizing new life and the coming of spring.

Egg rolling competitions take place in northern Britain on Easter Monday; hard-boiled eggs are rolled down a slope, with the winner being – according to local preference – the one with rolls the furthest, survives the most rolls, or is successfully aimed between two pegs! The best publicized event takes place at Avenham Park in Preston, Lancashire. Easter parades are also part of the Easter tradition, with those taking part wearing Easter bonnets or hats, traditionally decorated with spring flowers and ribbons.

May Day

May Day, international labour day, is really a very old festival. In Northern Europe there was a Druid festivity each spring in honour of Bel, the god of
fire. There were bonfires and man jumped through the flames to gain protection for the coming year.

In the Middle Ages May Day was an important day: in the very early morning, young girls went to the fields and washed their faces with dew. They believed this made them beautiful for a year. The young men from each village tried to win prizes with their bows and arrows. Maypoles were erected and people danced round them. It was called Morris dancing. Morris dancing was originally an all-male tradition, but now some teams feature women dancers too. On that day a May king or queen (the most beautiful girl) were chosen and crowned with flowers. The new king and queen selected their own court.

Today many English towns and villages still have a maypole and the villagers dance round it.

The maypole is a tall pole from which long coloured ribbons hang. Dancers, in period costumes, skip round the maypole holding a ribbon each, to traditional tunes. They often sing old songs, too, and ribbons are woven into a pattern all down the pole.

Maypole dancing goes on at village fairs all over the country. Many schools also teach country dancing as part of the curriculum.

**Celebrations in the USA**

The United States has long been the «melting pot» of the world, and various peoples have brought with them native celebrations. But some holidays which are celebrated throughout the United States originated on the American soil.

The number of holidays is different in various states. Of all the states, Oklahoma has the most holidays – 20. The District of Columbia has the least – only eight days.

The most widely celebrated holidays in all the states are:
- New Year's Day (January 1)
- Lincoln's Birthday (February 12)
- Washington's Birthday (February 22)
- Easter (end of April – beginning of May)
- Independence Day (July 4)
- Labour Day (first Monday in September)
- Thanksgiving Day (fourth Thursday in November)
- Christmas (December 25)

Here are a few words about some of them:

**Independence Day**

The history of English settlement in America dates back to the beginning of the 17th century. The first settlers were followed by other groups of immigrants who came to the New World from the Old World.
From that time till the end of the 18th century America was a British colony.

At the end of the 18th century the American colonies won a victory over the British Army in the War for Independence. It was on July 4, 1776, that the Declaration of Independence was signed, proclaiming the independence from Great Britain of 13 British colonies in America. These 13 colonies became the first 13 states of the United States of America and are represented on the American flag with thirteen stripes of red and white. The number of stars (which was originally 13) changed with the addition of new states. It has reached the number of 50.

The Fourth of July has been celebrated ever since as the most important American holiday. Years ago it was the custom everywhere to celebrate the day with big parades, fireworks and bonfires. But now the day is celebrated more quietly.

In towns and cities the Fourth of July is manifested by flag displays. Occasionally there are parades, people go on picnics or take trips to the country.

**Washington's Birthday**

George Washington (1732–1799), the first American President, was born in Virginia on February 22, 1732. He led the American Army to victory in the War for Independence. Later he was elected President of the United States and was in office for 8 years (1739–1797). All over the United States Americans have honored George Washington by naming after him their national capital, a state and several communities.

**Lincoln's Birthday**

Another great American President, Abraham Lincoln (1809–1865), was born on February 12, 1809. Lincoln was President during the Civil War (1861–1865). In this critical period Lincoln led the fight to keep the nation together and to free the slaves. His life ended tragically. He was killed at the theatre during the performance soon after the victory of the North. In honour of this great man a beautiful memorial has been built in Washington, D.C.
Labour Day

It is celebrated on the first Monday in September. On this day workers make a public show with marches, meetings, etc. It also marks the beginning of the school year.

Thanksgiving Day

It falls on the fourth Thursday of November. This is a day which honours the memory of the first settlers who came to America. It is also associated with the end of the harvest season.

Christmas

Christmas is a Christian holiday that celebrates the birth of Jesus Christ. For millions of Christians throughout the world it is the happiest and the busiest time of the year. No one knows the exact date of Christ's birth but most Christians celebrate Christmas on December 25. The word Christmas comes from Christes masse, an early English phrase that means Mass of Christ.

People of different countries celebrate Christmas in various ways. People in the United States and Canada decorate their homes with Christmas trees, wreaths and ornaments. City streets are filled with coloured lights; the sound of bells and Christmas carols can be heard everywhere.

Children write letters to Santa Claus and tell him what presents they would like to get. Many department stores hire people to wear a Santa Claus costume and listen to children's requests. People send Christmas cards to relatives and friends. Many companies give presents to their employees.

A Christmas tree is one of the main symbols of Christmas in most homes. Relatives and friends may join in trimming the tree with lights, tinsel, and colourful ornaments. Presents are placed under the tree. On Christmas Eve or Christmas morning, families open their presents.

Many children believe that Santa Claus arrives on Christmas Eve in a sleigh pulled by a reindeer and brings presents. Some children hang up stockings so Santa Claus can fill them with candy, fruit and other small gifts.

In many parts of the United States and Canada groups of people walk from house to house and sing Christmas carols. Some people give singers money or small gifts or invite them for a warm drink.
Many people attend church services on Christmas Eve or Christmas morning. They listen to readings from the Bible and singing Christmas carols.

A traditional Christmas dinner consists of stuffed turkey, mashed potatoes, cranberry sauce, and a variety of other dishes. Some families have ham or roast goose instead of turkey. Pumpkin pie, plum pudding, and fruitcake are favourite desserts.

Valentine’s Day

Valentine’s Day started over two thousand years ago as a winter festival, on 15 February. On that day, pagans asked their gods to give them good fruit and vegetables, and strong animals.

When the Christians came to Britain, they came with a story about a man called Saint Valentine. The story is that Valentine was a Christian who lived in the third century (between the years 200 and 300). The Roman Emperor at the time, Claudius II, was not a Christian. Claudius decided that his soldiers must not marry, because married soldiers do not make good soldiers. Valentine worked for the church, and one day he helped a soldier to get married. The Emperor said that Valentine had to die because he did wrong. In prison Valentine started to love the daughter of a man who worked in the prison. The day he died, he sent a note to this woman, and at the end of the note, he said: ‘Your Valentine’. He died on 14 February, so the date of the festival changed from 15 to 14 February, and the name changed to Saint Valentine’s Day.

In the early nineteenth century, when the post office started in Britain, people started to send Valentine’s cards to the person they loved on 14 February.

The cards had pictures of flowers and birds on, and words inside like:

*Roses are red, my love,*

*Violets are blue,*

*Sugar is sweet, my love,*

*But not as sweet as you.*

People still send each other Valentine’s cards, but often they do not write their names inside: they just write ‘Be my Valentine,’ or ‘From your Valentine’. It is a kind of game.

Some children give their friends or teachers cards or chocolates. A man will perhaps give his girlfriend or wife red roses.

A lot of people go out to restaurants for the evening and have dinner for two, with candles and soft music.
### IV. SUPPLEMENT

#### READING RULES

1. Гласные и сочетания с ними в ударном слоге

<table>
<thead>
<tr>
<th>A</th>
<th>pale, land, fan, fame, made, mad, sake, ban, tape, as, far, parcel, dark, farmer, hardly, hard, dare, mare, rare, fare, bare, parents, Mary.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ai</td>
<td>wait, rain, mail, bail, main, ray, pay, may, bay, lay</td>
</tr>
<tr>
<td>air</td>
<td>air, hair, lair, fair, pair, chair, airplane</td>
</tr>
<tr>
<td>au</td>
<td>auto, pause, autumn, auk, Paul, law, saw, dawn, pawn, maw</td>
</tr>
<tr>
<td>al + согл</td>
<td>ball, hall, wall, fall, false, chalk, walk, talk, salt</td>
</tr>
<tr>
<td>ass</td>
<td>pass, brass, grass, glass, class</td>
</tr>
<tr>
<td>ast</td>
<td>fast, vast, last</td>
</tr>
<tr>
<td>ask</td>
<td>ask, mask, bask, task, basket-ball, cask</td>
</tr>
<tr>
<td>asp, aft</td>
<td>grasp, after, draft, craft</td>
</tr>
<tr>
<td>ath</td>
<td>path, bath, father, rather, lather</td>
</tr>
<tr>
<td>E</td>
<td>ebb, lest, mete, met, her, herd, fern, term, nerve, here, mere, sphere</td>
</tr>
<tr>
<td>ea</td>
<td>team, meat, mean, dean, leaf, sea, peak, cheap</td>
</tr>
<tr>
<td>ee</td>
<td>bee, meet, deep, feel, need, seek, speech, fee, feed</td>
</tr>
<tr>
<td>ea + d</td>
<td>head, dead, bread, ready, dread, meadow</td>
</tr>
<tr>
<td>eight</td>
<td>eight, weight, freight, neigh, weigh</td>
</tr>
<tr>
<td>ew</td>
<td>few, dew, pew, new, flew, blew, grew, drew, jew</td>
</tr>
<tr>
<td>ei [i]</td>
<td>perceive, receive, deceive, ceiling</td>
</tr>
<tr>
<td>ey</td>
<td>grey, obey, they</td>
</tr>
<tr>
<td>eer</td>
<td>beer, peer, deer, leer, veer, engineer, pioneer</td>
</tr>
<tr>
<td>ear</td>
<td>ear, dear, beard, fear, hear, spear</td>
</tr>
<tr>
<td>ear + согл.</td>
<td>learn, earn, early, heard</td>
</tr>
<tr>
<td>I</td>
<td>fill, mile, size, lie, die, miss, kill, bird, firm, fir, sir, first, girl, tire, fire, hire, wire, mire</td>
</tr>
<tr>
<td>ie</td>
<td>piece, niece, chief, field, brief</td>
</tr>
<tr>
<td>ia, io</td>
<td>trial, liar, dial, lion, via, diary</td>
</tr>
<tr>
<td>i + ld, nd</td>
<td>mild, wild, child, mind, find, kind, blind</td>
</tr>
<tr>
<td>i + gh</td>
<td>night, light, might, right, high, sigh</td>
</tr>
<tr>
<td>O</td>
<td>so, vote, rode, pop, fox, loss, port, form, horn, lord, bore, more, ore, tore, before</td>
</tr>
<tr>
<td>oa</td>
<td>oak, boat, toast, load, toad, soap, coal</td>
</tr>
<tr>
<td>oi, oy</td>
<td>toil, boil, oil, boy, toy, annoy, coy, appoint</td>
</tr>
<tr>
<td>oo + k</td>
<td>look, shook, rook, nook, crook, took</td>
</tr>
<tr>
<td>oo + l, m, n</td>
<td>pool, fool, loom, doom, soon, spoon</td>
</tr>
<tr>
<td>o + ld</td>
<td>bold, fold, told, old, sold, hold</td>
</tr>
<tr>
<td>ou</td>
<td>out, about, pound, round, sound, found, loud</td>
</tr>
<tr>
<td>ow + согл.</td>
<td>down, brown, town, powder, cows, vow</td>
</tr>
<tr>
<td>ough + t</td>
<td>ought, fought, brought, sought, nought</td>
</tr>
</tbody>
</table>
2. Согласные и наиболее употребительные сочетания с ними

| c | face, cell, cite, city, cyst, cake, cab, cod, cut, club, picnic, scene, science, scent, scythe |
| ch (tch) | chess, catch, choke, fetch, such, patch, speech |
| ck | lack, peck, stick, neck, stock, back, lock |
| g | cage, large, gap, glide, golf, dog, egg, gin, gem, gun, gyps, gentle, game |
| gu + уд. гл. = [g] | guide, guess, guest, guilt, guard |
| dge | judge, bridge, edge, sledge, knowledge |
| s | nose, Chinese, sees, papers, beggars, tides, times, sea, sit, cast, cups, scent, sense |
| sh | shut, sheet, ship, dish, clash, wash, push |
| ng | long, sing, young, bring, kings, bang, wing, English, England, angry, hungry, language |
| nk | sink, bank, drink, tank, frankly, rink, rank |
| w + ar | war, warm, ward, warp, ward, dwarf |
| w (h) + a | what, watch, was, wander, swank, swan, swam |
| qu | queen, quite, quicker, quiz, quote, squeeze, quit |
| qu + ar | quart, quarter, quartz |
| x + уд. гл. [gz], [ks] | exam, exist, exact, example, box, six, fox, mix, text, next, sex |
| -tion, -ssion | station, national, fiction, mention, diction, resolution, constitution, demonstration, session, mission, commission, discussion |
| -ture | picture, lecture, future, creature, pasture |
| -ous | famous, glorious, dangerous, numerous, obvious, nervous, serious |

Сокращения

aren't = are not
can't = cannot
couldn't = could not
didn't = did not
doesn't = does not
don't = do not
hasn't = has not
haven't = have not
he'd = he would или he had
he'll = he will
he's = he is или he has
I'd = I would или I had
I'll = I shall или I will
I'm = I am
isn't = is not
I've = I have

she's = she is или she has
shouldn't = should not
there's = there is или there has
they'd = they would или they had
they'll = they will
they're = they are
they've = they have
wasn't = was not
we'd = we would или we had
we'll = we shall или we will
we're = we are
we've = we have
won't = will not
you'd = you would или you had
you'll = you will
you're = you are
shan't = shall not  you've = you have

Основные суффиксы существительных

ance  appearance
ence  dependence
dom  freedom
er  worker
or  visitor
ion  action
tion  construction
ation  information
ism  socialism
ist  socialist, specialist
ment  movement, development
ness  darkness, happiness
ship  friendship
ssion  transmission
th  strength, length
ty  difficulty
ity  reality

Основные суффиксы прилагательных

able  suitable, breakable
ible  flexible
al  economical
ant  significant
ent  dependent
en  golden
ful  successful, useful
ic  historic, patriotic
ish  childish, bluish
ive  active
less  useless, helpless
ly  lovely
ous  dangerous, nervous
y  lucky

Основные суффиксы наречий

ly  slowly
wards  towards
### Основные суффиксы глаголов

<table>
<thead>
<tr>
<th>ate</th>
<th>translate</th>
</tr>
</thead>
<tbody>
<tr>
<td>en</td>
<td>lengthen, shorten</td>
</tr>
<tr>
<td>fy</td>
<td>electrify</td>
</tr>
<tr>
<td>ish</td>
<td>establish</td>
</tr>
<tr>
<td>ize</td>
<td>centralize, organize</td>
</tr>
<tr>
<td>ute</td>
<td>commute</td>
</tr>
</tbody>
</table>

### Основные суффиксы числительных

<table>
<thead>
<tr>
<th>teen</th>
<th>(от 13 до 19) nineteen</th>
</tr>
</thead>
<tbody>
<tr>
<td>ty</td>
<td>(десятки) twenty, thirty</td>
</tr>
<tr>
<td>th</td>
<td>(порядковые) fourth, seventh</td>
</tr>
</tbody>
</table>

### Приставки с различными значениями

| anti- | antifrictional – противофрикционный |
| ex-   | ex-president – экс-президент       |
| extra-| extra-modern – супер-модный         |
| fore- | to foresee – предвидеть            |
| inter-| interdependence – взаимозависимый   |
| over- | overheat – перегревать             |
| post- | postgraduate – аспирант            |
| pre-  | prehistoric – доисторический       |
| re-   | to reread – перечитывать          |
| semi- | semicircle – полукруг              |
| sub-  | subtropical – субтропический,       |
|       | substation – подстанция            |
| super-| supernatural – сверхъестественный   |
| trans-| to transpose – перемещать          |
| ultra-| ultra-sound – ультразвук            |
| under-| to underestimate – недооценивать,   |
|       | undersell – продавать дешевле       |
## GRAMMAR

### Видо-временные формы глагола

#### Active Voice

<table>
<thead>
<tr>
<th>MEAN-ING</th>
<th>ASPECT</th>
<th>SIMPLE</th>
<th>PROGRESSIVE</th>
<th>PERFECT</th>
<th>PERFECT PROGRESSIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspect</td>
<td></td>
<td>a common aspect</td>
<td>a process</td>
<td>priority</td>
<td>priority + process</td>
</tr>
<tr>
<td>When?</td>
<td></td>
<td>At what time?</td>
<td>By what time?</td>
<td></td>
<td>Since what time?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>How long?</td>
</tr>
</tbody>
</table>

#### Period of Time

<table>
<thead>
<tr>
<th>Present</th>
<th>Yesterday, last week (month, year), long ago</th>
<th>yesterday at 3 p.m., yesterday from 6 till 7, when you came...</th>
<th>yesterday by 3 p.m., before some time in the past...</th>
<th>yesterday since 3 p.m., for some time in the past</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>+ V, Vs</td>
<td>+ Ving</td>
<td>+ Ving</td>
<td>+ Ving</td>
</tr>
<tr>
<td>?</td>
<td>Do/does... V</td>
<td>inversion</td>
<td>inversion</td>
<td>inversion</td>
</tr>
<tr>
<td>-</td>
<td>Do/does + not + V</td>
<td>Am/is/are + not + Ving</td>
<td>Have/has + not + Ving</td>
<td>Have/has + not + been + Ving</td>
</tr>
</tbody>
</table>

#### Past

<table>
<thead>
<tr>
<th>Past</th>
<th>tomorrow, next week (month, year)</th>
<th>tomorrow at 3 p.m., tomorrow from 6 till 7, when you come...</th>
<th>tomorrow by 3 p.m., by some time in the future...</th>
<th>tomorrow since 3 p.m., for some time in the future</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>will + V</td>
<td>will + be + Ving</td>
<td>will + have + Ving</td>
<td>will + have + been + Ving</td>
</tr>
<tr>
<td>?</td>
<td>will... V</td>
<td>inversion</td>
<td>inversion</td>
<td>inversion</td>
</tr>
<tr>
<td>-</td>
<td>won’t + V</td>
<td>won’t + be + Ving</td>
<td>won’t + have + Ving</td>
<td>won’t + have + been + Ving</td>
</tr>
</tbody>
</table>
Passive Voice

<table>
<thead>
<tr>
<th></th>
<th>SIMPLE</th>
<th>PROGRESSIVE</th>
<th>PERFECT</th>
<th>PERFECT PROGRESSIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Констатация факта</td>
<td>Процесс</td>
<td>Завершенность</td>
<td>Процесс в течение некоторого периода времени</td>
</tr>
<tr>
<td>Present</td>
<td>Am / V-ed</td>
<td>Is - being</td>
<td>Have / V-ed been</td>
<td>Вместо отсутствующих форм</td>
</tr>
<tr>
<td></td>
<td>Am / V-ed</td>
<td>Are / V3</td>
<td>Has / V3</td>
<td>Perfect Progressive</td>
</tr>
<tr>
<td></td>
<td>I am invited</td>
<td>Menя приглашают (каждый год)</td>
<td>I have been invited</td>
<td>Употребляются формы</td>
</tr>
<tr>
<td>Past</td>
<td>Was / V-ed</td>
<td>Was / V-ed - being</td>
<td>Had been / V3</td>
<td>Future Perfect</td>
</tr>
<tr>
<td></td>
<td>I was invited</td>
<td>Menя приглашили (вчера)</td>
<td>I had been invited</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I was being invited</td>
<td>Menя приглашили (вчера в два часа; когда он вошел)</td>
<td>Menя уже пригласили (к тому времени, когда он пришел)</td>
<td></td>
</tr>
<tr>
<td>Future</td>
<td>/ V-ed</td>
<td>Will be / V3</td>
<td>Will have been / V3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I will be invited</td>
<td>Menя пригласят (завтра)</td>
<td>I will have been invited</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Меня уже пригласят (к трём часам)</td>
<td></td>
</tr>
</tbody>
</table>

Функции инфинитива в предложении

<table>
<thead>
<tr>
<th>n/n</th>
<th>Функция</th>
<th>Пример</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Подлежащее</td>
<td>To skate is pleasant.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Кататься на коньках приятно.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To read is a great pleasure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ЧИТАТЬ (чтение) – большое удовольствие.</td>
</tr>
<tr>
<td>2</td>
<td>Именная часть составного сказуемого</td>
<td>Your duty was to inform me about it</td>
</tr>
<tr>
<td></td>
<td></td>
<td>immediately.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ващей обязанностью было сообщить мне об этом немедленно.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The duty of every student is to master</td>
</tr>
<tr>
<td></td>
<td></td>
<td>at least one foreign language.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Долг каждого студента — овладеть.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>по крайней мере, одним иностранным языком.</td>
</tr>
<tr>
<td></td>
<td>Часы составного глагольного сказуемого</td>
<td>She began to translate the article.</td>
</tr>
</tbody>
</table>
3. мого в сочетании с модальными глаголами и с глаголами, выражающими начало, продолжение или конец действия (to begin, to continue, to end, to stop) или отношение к действию, обозначенному инфинитивом (to want, to decide, to intend)

Она начала перевести статью. She must translate this article today. Она должна перевести эту статью сегодня.

4. Дополнение

I asked him to help me. Я попросил его помочь мне.
He had promised me to draw this map. Он обещал мне начертить эту карту.

5. Определение. Инфинитив в функции определения стоит после определяемого слова

He expressed a desire to help me. Он выразил желание помочь мне.
The device to be tested has been brought to our library. Прибор, который надо испытать (подлежащий испытанию), принесен в нашу лабораторию.

6. Обстоятельство цели или следствия. В функции обстоятельства инфинитив может стоять как в начале предложения, так и в конце. В функции обстоятельства цели инфинитиву могут предшествовать союзы: in order, so as (чтобы, для того чтобы)

I went to the station to see off a friend. Я поехал на вокзал, чтобы проводить приятера.
You must work much in order to master a foreign language. = In order to master a foreign language you must work much.
You must work much in order to master a foreign language. = In order to master a foreign language you must work much.

Формы инфинитива

<table>
<thead>
<tr>
<th></th>
<th>Active</th>
<th>Passive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indefinite</td>
<td>to accept</td>
<td>to be accepted</td>
</tr>
<tr>
<td>Continuous</td>
<td>to be accepting</td>
<td>—</td>
</tr>
<tr>
<td>Perfect</td>
<td>to have accepted</td>
<td>to have been accepted</td>
</tr>
<tr>
<td>Perfect Continuous</td>
<td>to have been accepting</td>
<td>—</td>
</tr>
</tbody>
</table>

Формы герундия

<table>
<thead>
<tr>
<th>Время (Tense)</th>
<th>Активный залог (Active)</th>
<th>Пасивный залог (Passive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>глагол + ing</td>
<td>being + Participle II</td>
</tr>
<tr>
<td></td>
<td>He admitted to stealing a wallet – Он признался в краже кошелька.</td>
<td>I like being helped with my homework – Мне нравится, когда мне помогают с домашним заданием.</td>
</tr>
</tbody>
</table>
Mary hates cleaning the flat – Мэри ненавидит убирать квартиру.
You enjoy being photographed – Тебе нравится, когда тебя фотографируют.

<table>
<thead>
<tr>
<th>Perfect</th>
<th>having + Participle II</th>
<th>having been + Participle II</th>
</tr>
</thead>
<tbody>
<tr>
<td>They are proud of having talked with this person – Они гордятся тем, что разговаривали с этим человеком.</td>
<td>We called the police when we found our house having been robbed – Мы позвонили в полицию, когда обнаружили, что наш дом был ограблен.</td>
<td></td>
</tr>
<tr>
<td>I didn't approve of my daughter having sold the car – Я не одобряю, что моя дочь продала машину.</td>
<td>Mike heard of having been landed a job – Майк услышал, что его взяли на работу.</td>
<td></td>
</tr>
</tbody>
</table>

Формы причастий

<table>
<thead>
<tr>
<th>Participle I</th>
<th>Participle II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active</strong></td>
<td><strong>Passive</strong></td>
</tr>
<tr>
<td><strong>Indefinite</strong></td>
<td></td>
</tr>
<tr>
<td>changing</td>
<td>being changed</td>
</tr>
<tr>
<td>1) определение: изменяющий(-ся) (-вищий) (-ся)</td>
<td>1) определение: изменяющийся, изменяемый, который изменяется</td>
</tr>
<tr>
<td>2) обстоятельство изменя(-ся)</td>
<td>2) обстоятельство: будучи измененным сказуемым</td>
</tr>
<tr>
<td>3) сказуемое изменяется</td>
<td>3) глагол придаточного предложения (когда, в то время как) изменяет(-ся)</td>
</tr>
<tr>
<td><strong>Perfect</strong></td>
<td>having changed</td>
</tr>
<tr>
<td>обстоятельство: изменя(-ший)</td>
<td>having been changed</td>
</tr>
<tr>
<td></td>
<td>обстоятельство: когда (его) изменили, после того как (его) изменили</td>
</tr>
</tbody>
</table>

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Сложное дополнение (Complex Object)

Конструкция употребляется с ограниченным числом глаголов: to think, to believe, to consider, to know, to report, to say, to find, to think, to want, to wish, to desire, to prefer, to hate, to suppose, to expect и некоторых других.

<table>
<thead>
<tr>
<th>Существительные в общем падеже или местоимения в объектном падеже</th>
<th>Инфинитив</th>
</tr>
</thead>
<tbody>
<tr>
<td>We consider him to be our greatest scientist.</td>
<td>Мы считаем его нашим величайшим учёным.</td>
</tr>
<tr>
<td>We expect the radio to be widely used for car inspection.</td>
<td>Мы ожидаем, что радио будет широко использоваться при обследовании вагонов.</td>
</tr>
<tr>
<td>We know the rail joint to be the weakest place of the track.</td>
<td>Мы знаем, что рельсовой стык является самым слабым местом пути.</td>
</tr>
</tbody>
</table>

После глаголов восприятия (to feel, to see, to watch, to hear, to notice, to observe) и глагола to make в значении «заставлять» в сложном дополнении частица to перед инфинитивом отсутствует.

| I watched them lay the track. | Я наблюдал, как они укладывали путь. |
| He made me do this work. | Он заставил меня сделать эту работу. |

Сложное подлежащее (Complex Subject)

<table>
<thead>
<tr>
<th>Подлежащее в общем падеже или местоимение</th>
<th>Сказуемое в пассивном (или активном) залоге</th>
<th>Инфинитив</th>
<th>Второстепенные члены предложения</th>
</tr>
</thead>
<tbody>
<tr>
<td>He is said to know everything about this matter.</td>
<td>Говорят, что он знает об этом деле.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>He is supposed to be in his office now.</td>
<td>Предполагается, что он сейчас в офисе.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rock ballast seemed to be the most suitable for lines with heavy grades and sharp curves.</td>
<td>Оказалось, что балласт из скальных пород является наиболее подходящим материалом для линий с тяжелыми уклонами и крутыми кривыми.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Railway transport is likely to become the first mode of transportation.</td>
<td>Железнодорожный транспорт, вероятно, станет первостепенной формой перевозок.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Список наиболее употребительных нестандартных глаголов

<table>
<thead>
<tr>
<th>Перевод</th>
<th>Infinitive form</th>
<th>Past Indefinite</th>
<th>Participle II</th>
</tr>
</thead>
<tbody>
<tr>
<td>быть</td>
<td>be</td>
<td>was, were</td>
<td>been</td>
</tr>
<tr>
<td>становиться</td>
<td>become</td>
<td>became</td>
<td>become</td>
</tr>
<tr>
<td>начинать</td>
<td>begin</td>
<td>began</td>
<td>begun</td>
</tr>
<tr>
<td>ломать</td>
<td>break</td>
<td>broke</td>
<td>broken</td>
</tr>
<tr>
<td>приносить</td>
<td>bring</td>
<td>brought</td>
<td>brought</td>
</tr>
<tr>
<td>строить</td>
<td>build</td>
<td>built</td>
<td>built</td>
</tr>
<tr>
<td>покупать</td>
<td>buy</td>
<td>bought</td>
<td>bought</td>
</tr>
<tr>
<td>выбирать</td>
<td>choose</td>
<td>chose</td>
<td>chosen</td>
</tr>
<tr>
<td>приходить</td>
<td>come</td>
<td>came</td>
<td>come</td>
</tr>
<tr>
<td>резать</td>
<td>cut</td>
<td>cut</td>
<td>cut</td>
</tr>
<tr>
<td>делать</td>
<td>do</td>
<td>did</td>
<td>done</td>
</tr>
<tr>
<td>ехать, водить</td>
<td>drive</td>
<td>drove</td>
<td>driven</td>
</tr>
<tr>
<td>падать</td>
<td>fall</td>
<td>fell</td>
<td>fallen</td>
</tr>
<tr>
<td>сражаться</td>
<td>fight</td>
<td>fought</td>
<td>fought</td>
</tr>
<tr>
<td>находить</td>
<td>find</td>
<td>found</td>
<td>found</td>
</tr>
<tr>
<td>давать</td>
<td>give</td>
<td>gave</td>
<td>given</td>
</tr>
<tr>
<td>идти</td>
<td>go</td>
<td>went</td>
<td>gone</td>
</tr>
<tr>
<td>иметь</td>
<td>have</td>
<td>had</td>
<td>had</td>
</tr>
<tr>
<td>держать</td>
<td>hold</td>
<td>held</td>
<td>held</td>
</tr>
<tr>
<td>знать</td>
<td>know</td>
<td>knew</td>
<td>known</td>
</tr>
<tr>
<td>лидировать</td>
<td>lead</td>
<td>led</td>
<td>led</td>
</tr>
<tr>
<td>оставлять</td>
<td>leave</td>
<td>left</td>
<td>left</td>
</tr>
<tr>
<td>позволять</td>
<td>let</td>
<td>let</td>
<td>let</td>
</tr>
<tr>
<td>терять</td>
<td>lose</td>
<td>lost</td>
<td>lost</td>
</tr>
<tr>
<td>делать</td>
<td>make</td>
<td>made</td>
<td>made</td>
</tr>
<tr>
<td>встречать</td>
<td>meet</td>
<td>met</td>
<td>met</td>
</tr>
<tr>
<td>класть</td>
<td>put</td>
<td>put</td>
<td>put</td>
</tr>
<tr>
<td>читать</td>
<td>read</td>
<td>read</td>
<td>read</td>
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<tr>
<td>бежать</td>
<td>run</td>
<td>ran</td>
<td>run</td>
</tr>
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<td>видеть</td>
<td>see</td>
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<td>seen</td>
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<td>посылать</td>
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<td>sent</td>
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<tr>
<td>показывать</td>
<td>show</td>
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</tr>
<tr>
<td>говорить</td>
<td>speak</td>
<td>spoke</td>
<td>spoken</td>
</tr>
<tr>
<td>стоять</td>
<td>stand</td>
<td>stood</td>
<td>stood</td>
</tr>
<tr>
<td>брать</td>
<td>take</td>
<td>took</td>
<td>taken</td>
</tr>
<tr>
<td>думать</td>
<td>think</td>
<td>thought</td>
<td>thought</td>
</tr>
<tr>
<td>носить</td>
<td>wear</td>
<td>wore</td>
<td>worn</td>
</tr>
<tr>
<td>писать</td>
<td>write</td>
<td>wrote</td>
<td>written</td>
</tr>
</tbody>
</table>
EXAMINATION TOPICS

Our university

Irkutsk state railway transport university (ISRTU) is one of the best-known and most popular institutions of higher education in East Siberia. Every year a lot of young people try to get into the University. They take entrance examinations and pass interviews to become students of the University.

The University was founded in 1975. Before 1975 it was a branch of the Novosibirsk railway transport institute. At first there were 3 faculties: the Railway Construction, the Railway Operation and the Electro-Mechanical faculties.

Now about 12000 students are enrolled at the University. The University has 7 faculties: Management at transport and computer technologies, Systems of transport providing, Railway constructions, Economics and Finance, Transport systems, Management, logistics and customs, Extra-mural faculty.

There is also a department of foreign students. About 60 people from Mongolia study there.

The University trains students in different specialties such as Management, Finance, Bridges and Tunnels, Customs, Railway Economy, Crisis Management, Railway Operation and others. The curriculum includes subjects on specialties, social sciences, physical training and foreign languages.

Our University has a good library, reading rooms, a gymnasium and sports grounds. There are some student halls not far from the University.

A great number of departments help students prepare for their future work.

There are many well-equipped laboratories where students conduct various experiments. Highly qualified tutors, lecturers and professors give lectures and hold seminars on different subjects.

At the end of the 5th year the students present their graduation project and get the diploma of a railway engineer. It gives them the right to work at workshops, depots, locomotive building works, on construction sites, at scientific institutions and other offices and enterprises in different branches of national industry and economy. Some students who are good at scientific research carry on studying at postgraduate level.
Schooling in England

English educational system is quite different from what we have in Russia. It is class-divided. There some state schools and some private ones.

State schools are infant, junior or secondary. British boys and girls begin to go to school at the age of 5. They draw pictures, sing songs, listen to the stories and tales. British children begin to read and write when they enter the infant schools. Young children are divided into two groups, according to their mental abilities. Children leave infant schools when they are 7. Then they go to study at junior schools where they learn to write, read and do mathematics. Their school subjects are History, English, Geography, Arithmetic, Arts, Music, Swimming and some others. When the pupils enter the junior schools they pass abilities test. According to the results of the test and thus their intellectual potential they are divided into three groups. Boys and girls spend four years studying at junior schools.

Then they pass examinations again and enter the secondary schools. There are different types of secondary schools in Britain. They are: grammar schools, modern schools and comprehensive schools. English boys and girls attend secondary schools from 11 till 16. They don't go to schools on Saturdays and Sundays. In the modern schools pupils do not learn foreign languages. In grammar schools pupils receive better theoretical education. And the other school type is comprehensive schools. Almost all secondary pupils (around 90 per cent) go there.

There are also private schools in England. Boys and girls do not study together there. It is common that aristocracy sons go to these schools and parents pay a lot of money for their education. These schools are called public. Independent and preparatory schools are private ones too. They prepare children for public schools and take money for the training. The teachers of the private schools can pay more attention to each of the pupils personally. It is possible to enter the best English universities after leaving public schools. After finishing grammar schools pupils have good knowledge and may continue studying in colleges and universities.

English pupils wear school uniform. It is one of the oldest country's traditions. A boy's uniform includes a school cap, a tie and a blazer. A girl's uniform consists of a hat, a coat, a skirt and a blouse. The uniforms vary from school to school. Usually, they are dark.
About Irkutsk

Irkutsk is one of the largest cities of Siberia. It is situated almost in the centre of Asia not far from Lake Baikal. The city stands on the banks of the Angara River and its first large tributary - the Irkut. The Angara is wide, deep and swift. Its waters are cold even in summer. There are many legends about Lake Baikal, the Angara and the Yenissei. In the legends, the beautiful Angara is called the only daughter of the man Baikal.

More than three hundred years ago, in 1661, Cossacks built on the Angara bank opposite the mouth of the river Irkut a wooden fortress than was called Irkutsk fort. In 1686 Irkutsk was given the status of a town and it had its own coat of arms: a tiger symbolizing the might of the land – holding in his teeth a sable as a symbol of its riches. The riches came from furs, semiprecious stones, wood and trade with Mongolia and China.

Irkutsk is the administrative, economic and cultural centre of the Irkutsk region which is almost as large as two Frances or two Spains. The population of Irkutsk is more than 600,000 people.

Irkutsk is a town of students. There are many colleges, technical and vocational schools, higher educational Institutions such as: State University, Technical Research University, Baikal University of Economics and Law, State Railway Transport University, Agricultural Academy, Teacher’s Institute, Eurasian Linguistic Institute, Medical University.

Transsiberian railway

The construction of the Trans-Siberian Railway between 1891 and 1916 ended the era of great transcontinental railway building. The Trans-Siberian stretches 5,776 miles between Moscow’s Yaroslavsky Station and Vladivostok (6,117 miles from St. Petersburg). It takes a minimum of a week to traverse that distance by train.

The longest railway in the world, the Trans-Siberian project was mired in controversy from the moment Tsarevich Nicholas shoveled an inaugural spade full of dirt into an awaiting wheelbarrow in Vladivostok on May 31, 1891, until the completion of the Amur River Bridge at Khabarovsk in 1916. A technological marvel at the time, it soon bore the reputation of «a monument to bungling». The rails and crossties were too light, causing frequent derailments; the wooden bridges were flimsy; and, since the builders were mostly exiles and convicts, there was justifiable reason to believe that much of the line had been sabotaged.

Moreover, the estimated costs in 1916 U.S. dollars ranged from
$770 million to $1 billion, which represented one-fifth of Russia's national debt at the time. During its construction, the Trans-Siberian was a serious drain on the Russian economy and, between 1914 and 1916, on the war effort. Despite the criticism, the great railway more than paid for itself during the twentieth century. Still the only transportation artery to span Siberia and the Russian Far East, the Trans-Siberian has solidified Moscow's hold on Russia's eastern periphery.

The Trans-Siberian's principal commodities are coal, oil and oil products, and wood and wood products. Major non-Russian users of the railway, which is now double-tracked and electrified for much of its distance, are China, Japan, and South Korea.

**My country, Russia**

My country, the Russian Federation, is the largest state in the world. Its territory is over 17 million square kilometers. Russia is rich in natural resources including vast areas of fertile (arable) lands and forests, deep lakes and wide rivers. It is rich in mineral deposits, such as coal, oil, ore, tin, lead, copper, gold and others.

The Russian Federation is a free union of a number of territories and autonomous republics, for example, Karelia, Tatarstan, Bashkortostan, Mordovia and others.

The highest legislative body of the Russian Federation is Duma, the name of the Russian Parliament which consists of two chambers. The executive power is held by the President and the Cabinet of Ministers. The candidate of the Prime-Minister, put forward by the head of the state, is to be approved by Duma.

The capital of Russia is Moscow. It is the most important political, industrial, scientific and cultural centre of the country.

Russia is on two continents – Europe and Asia. But only 20 % of Russia is in Europe. Russia has a population of about 143 million people. 75 % of the population live in European part. The weather is better there. Almost four times as many people live in cities as in villages. The 12 biggest cities have a population of over 1 million people each.

Everyone in Russia speaks Russian as their national language. Local languages are very important too. Children study them at school. There are five main religions in Russia.

The Russian flag first appeared in 1668. It was the symbol of Russia for more than 300 years. It reappeared as the modern flag in 1991. The flag has three wide stripes on it. The colours of the flag are symbolic. White is faithful and sincere, blue is honest and loyal and red is brave.
The double-headed eagle is the emblem of Russia. Above the heads there are three crowns. The eagle carries a sceptre, the sign of state power, and an orb, the sign of unity. You can see St George on the breast of the eagle. It is the oldest Russian symbol of love for the Motherland. You can also see the eagle on the back of modern Russia coins.

**Great Britain**

Great Britain (official name – the United Kingdom of Great Britain and Northern Ireland) is situated on two large islands, the larger of which is Great Britain, the smaller is Ireland. In addition to these two islands Great Britain includes over five hundred small islands. The total area of Great Britain is 240,000 sq. km, its population is 57,000,000 people.

In the north-west and west the country is washed by the Atlantic Ocean and the Irish Sea, in the east – by the North Sea. The island of Great Britain is separated from France by the English Channel. Northern Ireland, which is a part of Great Britain and which is situated on the island of Ireland, is separated from Great Britain by the North Channel.

The island of Great Britain is divided into two parts: mountainous (in the north and west of the island) and lowland (in the south and east). There are no very long rivers in Great Britain. The most important rivers are the Thames (the deepest) and the Severn (the longest). The rivers seldom freeze in winter. Due to moderating influence of the sea Great Britain has an insular climate, rather humid and mild, without striking discrepancy between seasons.

Great Britain consists of four main parts: England, Scotland, Wales, and Northern Ireland. Administratively Great Britain is divided into 55 counties. The biggest cities of Great Britain are London, Birmingham, Glasgow, Liverpool, Manchester, Edinburgh, and Cardiff.

England is the largest part of Great Britain (it occupies over 50 % of the territory and its population amounts to 83 % of the total population of Great Britain). Wales is a peninsula in the south-west of the island of Great Britain. It occupies about 9 % of its territory with the population of 4.8 % of the total population. The Welsh speak their own language. Scotland is the most northern part of Great Britain with the territory of 32 % of the total territory and with the population of 9 % of the total population of Great Britain. Northern Ireland occupies the north-east part of the island of Ireland. Its territory amounts to 5.2 % of the total territory of Great Britain. The main cities of Northern Ireland are Belfast and Londonderry.

Great Britain is a parliamentary monarchy. Officially the head of the state is the Queen (or the King). However, the power of the Queen in
Great Britain is not absolute. She acts only on the advice of the ministers and Parliament. There is no written constitution in Great Britain. The main principles of British legislation are expressed in other documents, like «Magna Charta», «Habeas Corpus Act», «Bill of Rights», the Parliamentary Act which decided the position of the House of Lords, the Judicature Act, etc. The British legislation does not provide written guarantees of individual political rights.

Parliament in Great Britain exists since 1265 and is the eldest Parliament in the world. It consists of two Houses – the House of Lords and the House of Commons. The House of Lords consists of 1000 peers who are not elected by the people. The House of Commons is a nation-wide representative body which is elected by the people at a general election not less frequently than once in 5 years. After the general election the Queen appoints the head of the government – the Prime Minister. As a rule the Prime Minister is the leader of the party that has won the election. The Prime Minister appoints the ministers to compose the government.

There are two main political parties in Great Britain: the Conservative party and the Labour party. The Conservative party came into being in the 19th century as a result of the evolution of the Tory party. The Labour party was founded in 1900. For the first time the Labour Party won the election in 1945.

Great Britain is a highly-developed industrial country. The main fields of British industry are machine-building, ship-building, metallurgy, electronics, etc.

**Carriages and wagons**

The cars used on the early railways were very much like the stage-coaches. Drawn by horses these vehicles had flanged wheels which kept them on the rails. The very first freight cars were open-top wagons which had wooden wheels and were pulled by horses along wooden rails. They were followed by platform cars (flat cars). Later, covered cars appeared.

Today the railroads have several classes of freight cars (covered cars and open-top cars). The box car is the most common type of a covered car. It carries all kinds of ordinary goods. A refrigerator car is a special type of a box car; it is used for hauling food products. The walls, floor and roof are air- and waterproof to protect goods from the heat. Another type of a car is a tank car used for liquid goods. It has an opening on the top and a special device in the bottom. Hopper car is one more type of a covered car. It carries goods: sugar, flour, cement, grain and other.
There are some types of open-top cars. Gondola car is one of them. It transports coal, ore, gravel. It is designed for mechanized loading and unloading. The flat car is used for transporting rails, beam, timber, and machines. They can also carry containers. The container traffic reduces the cost of loading and unloading goods, decreases the danger of their breakage. There exist special freight cars for special kinds of goods. The example of a special type car is a double-deck car used to carry automobiles, the transportation of which by rail is more economical than by road.

The modern passenger rolling stock is built with two types of inside arrangement. One is the compartment type with a side corridor and the other is the open vehicle with a central passage. Modern carriages are made of light-weight steel, aluminum and plastics. These materials reduce the rolling stock weight, decrease the car corrosion and maintenance cost.

**System of education in Russia**

There are many kinds of educational establishments in this country: primary and secondary schools, secondary technical schools, vocational schools, colleges, institutes, universities, academies.

In the primary schools children study from seven to eleven. Here they learn to read, write and do simple arithmetic. They draw, model and sing. After the primary school children may go to a secondary school. In this school they study from ten to seventeen. The following subjects are taught here: Russian, chemistry, physics, literature, foreign languages, mathematics, informatics and many others. After finishing secondary school pupils get the General Certificate of Education. These two types of schools are open five days a week.

Children may continue their education in the secondary technical schools, vocational schools, colleges or any higher educational institutions (institutes, universities or academies). The University or Institute campus consists of the teaching blocks, administrative block, libraries, sport centre, union building and hostels. The term of instruction is different in different types of educational establishments. To enter the University you must take entrance examinations which are different in different universities. They depend upon the faculty you are going to study at. Some forms of education are free or charge and students get grants. But nowadays there are a lot of new educational forms where tuition is paid by the students.

The academic year is divided into two terms. At the end of every term students take tests and examinations. After passing examinations they have vacation, so they have vacation (holidays) twice a year: in
winter and in summer. They spend their summer holidays in different ways. Some return home, some stay at the students camp for a few weeks, some join together in building teams. During the academic year students live with their parents or in the hostel, or rent rooms.

For those people who work after leaving school there is a system of further education in Russia: evening and extra-mural students have classes during mid-sessional examinations (in winter) and sessionals (in June).

After finishing the Institute or University students get a diploma on their specialty.

If you want to continue your education and if you have a bent for research work you may apply for an advanced course of study extending over three years. You should pass three examinations (in philosophy, English and your specialty) to be admitted to post-graduate study. The first post-graduate degree is that of candidate of science. Every post-graduate working on a research problem has an adviser. On completing your course of study you must submit a thesis. If the thesis is satisfactory on all points, the post-graduate will be awarded the degree of Candidate of Science. The degree of Doctor is given for a thesis which is considered to be an original contribution to our knowledge.
### VOCABULARY

<table>
<thead>
<tr>
<th>English</th>
<th>Russian</th>
</tr>
</thead>
<tbody>
<tr>
<td>to accelerate, v</td>
<td>ускорять</td>
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<tr>
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<td>авария</td>
</tr>
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<td>accuracy, n</td>
<td>точность</td>
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<td>to adhere, v</td>
<td>сцепляться</td>
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<td>сцепление</td>
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<td>регулировать</td>
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<td>assembly, n</td>
<td>узел, комплект, агрегат</td>
</tr>
<tr>
<td>to assist, v</td>
<td>помогать</td>
</tr>
<tr>
<td>atom-power engine</td>
<td>атомный реактор</td>
</tr>
<tr>
<td>average, a</td>
<td>средний</td>
</tr>
<tr>
<td>axle, n</td>
<td>ось</td>
</tr>
<tr>
<td>axlebox, n</td>
<td>букса, подшипниковая коробка</td>
</tr>
<tr>
<td>battery, n</td>
<td>батарея</td>
</tr>
<tr>
<td>storage battery</td>
<td>аккумуляторная батарея</td>
</tr>
<tr>
<td>beam, n</td>
<td>балка</td>
</tr>
<tr>
<td>bearing, n</td>
<td>подшипник</td>
</tr>
<tr>
<td>berth, n</td>
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<tr>
<td>body, n</td>
<td>кузов</td>
</tr>
<tr>
<td>bottom, n</td>
<td>дно</td>
</tr>
<tr>
<td>brake, n</td>
<td>тормоз</td>
</tr>
<tr>
<td>braking device</td>
<td>тормозное устройство</td>
</tr>
<tr>
<td>dynamic braking</td>
<td>динамическое торможение</td>
</tr>
<tr>
<td>bulk</td>
<td>большое количество, большие размеры</td>
</tr>
<tr>
<td>cable, n</td>
<td>кабель</td>
</tr>
<tr>
<td>capacitor, n</td>
<td>конденсатор</td>
</tr>
<tr>
<td>capacity, n</td>
<td>мощность</td>
</tr>
<tr>
<td>carrying capacity</td>
<td>провозная способность</td>
</tr>
<tr>
<td>car, n</td>
<td>вагон</td>
</tr>
<tr>
<td>- box car</td>
<td>крытый грузовой вагон</td>
</tr>
<tr>
<td>- gondola car</td>
<td>полувагон</td>
</tr>
<tr>
<td>- flat car = platform car</td>
<td>вагон-платформа</td>
</tr>
<tr>
<td>- hopper car</td>
<td>вагон-хоппер</td>
</tr>
<tr>
<td>- refrigerator car</td>
<td>рефрижератор</td>
</tr>
<tr>
<td>English Word</td>
<td>Russian Translation</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>tank car</td>
<td>вагон-цистерна</td>
</tr>
<tr>
<td>carriage, n</td>
<td>пассажирский вагон</td>
</tr>
<tr>
<td>to carry, v</td>
<td>перевозить</td>
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<tr>
<td>charge, n</td>
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<tr>
<td>coach, n</td>
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<tr>
<td>comfort, n</td>
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</tr>
<tr>
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<td>полупроводник</td>
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<tr>
<td>conductivity, n</td>
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<tr>
<td>converter, n</td>
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<tr>
<td>counter, n</td>
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<tr>
<td>coil, n</td>
<td>катушка</td>
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<tr>
<td>coefficient, n</td>
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<tr>
<td>coupling, n</td>
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<tr>
<td>clay, n</td>
<td>глина</td>
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<tr>
<td>circuit, n</td>
<td>цепь, контур, схема</td>
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<td>short circuit</td>
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<tr>
<td>coach, n</td>
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<tr>
<td>to connect, v</td>
<td>соединять (последовательно)</td>
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<tr>
<td>to construct, v</td>
<td>строить</td>
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<tr>
<td>consumer, n</td>
<td>потребитель</td>
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<td>consumption, n</td>
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<td>contact wire, n</td>
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<td>faulty contacts</td>
<td>неисправные провода</td>
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<tr>
<td>to control, v</td>
<td>управлять, регулировать</td>
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<tr>
<td>remote control</td>
<td>дистанционное управление</td>
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<tr>
<td>convenient, a</td>
<td>подходящий</td>
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<td>conventional, a</td>
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<tr>
<td>conversion, n</td>
<td>превращение, переход</td>
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<tr>
<td>to convert, v</td>
<td>превращать</td>
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<tr>
<td>cost, n</td>
<td>стоимость</td>
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<td>initial cost</td>
<td>первоначальная стоимость</td>
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<td>коленчатый вал</td>
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<td>crew, n</td>
<td>бригада</td>
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<td>crossing, n</td>
<td>переход, переезд</td>
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<td>ток</td>
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<td>переменный ток</td>
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<td>- current input</td>
<td>подводимый ток</td>
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<tr>
<td>- direct current</td>
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<td>curve, n</td>
<td>кривая</td>
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D

damage, n
dangerous, a
to decrease, v
density, n
departure, n
to design, v
to detect, v
development, n
deivation, n
device, n
disadvantage, n
distant signal
to distribute, v
distribution, n
downgrade, n
draw gear
drawback, n
to drive, v (a locomotive)
driver, n
driving cab
drop, n
duplex operation

efficiency, n
efficient, a
effort, n
tractive effort
electric, a
electricity, n
to electrify, v
electrified, a
electricity grid
electromotive force
emergency, n
energy, n
engine, n
- fire engine
- internal combustion engine
to start an engine
engineman, n
essential, a
to equip, v

ущерб
опасный
уменьшать
плотность
отправление, отбытие
конструировать
обнаруживать
развитие
отклонение
устройство, прибор
недостаток
семафор
распределять
распределение
уклон
тяговое устройство
недостаток
управлять (локомотивом)
машинист
кабина машиниста
понижение
дуплексная работа связи

E

эффективность, КПД
эффективный
усилие
тяжовое усилие
электрический
электричество
электрифицировать
электрифицированный
электрическая система
электродвигущая сила
авария
энергия
машина, двигатель; локомотив
пожарная машина
двигатель внутреннего сгорания
запускать двигатель
машинист
основной
оборудовать
<table>
<thead>
<tr>
<th>English</th>
<th>Russian</th>
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<tr>
<td>equipment, n</td>
<td>оборудование</td>
</tr>
<tr>
<td>- control equipment</td>
<td>оборудование управления</td>
</tr>
<tr>
<td>- overhead equipment</td>
<td>контактное управление</td>
</tr>
<tr>
<td>expensive, a</td>
<td>дорогой</td>
</tr>
<tr>
<td>facilities, n</td>
<td>оборудование, устройство</td>
</tr>
<tr>
<td>fault, n</td>
<td>повреждение, неисправность</td>
</tr>
<tr>
<td>to feed (fed, fed)</td>
<td>питать</td>
</tr>
<tr>
<td>filter, n</td>
<td>фильтр, очиститель</td>
</tr>
<tr>
<td>to fit, v</td>
<td>устанавливать, монтировать</td>
</tr>
<tr>
<td>to be fitted</td>
<td>быть снабженным</td>
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<td>fittings, n</td>
<td>оборудование, арматура</td>
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<td>fixed, a</td>
<td>неподвижный</td>
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<tr>
<td>freight, n</td>
<td>грузы</td>
</tr>
<tr>
<td>- freight turnover</td>
<td>грузооборот</td>
</tr>
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<td>frequency, n</td>
<td>частота</td>
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<td>friction, n</td>
<td>трение</td>
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<tr>
<td>fuel, n</td>
<td>топливо</td>
</tr>
<tr>
<td>- fuel expenditure (expenses)</td>
<td>расход топлива</td>
</tr>
<tr>
<td>to furnish, v</td>
<td>поставлять, снабжать, оборудовать</td>
</tr>
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<td>gap, n</td>
<td>зазор</td>
</tr>
<tr>
<td>ganger, n</td>
<td>бригадир</td>
</tr>
<tr>
<td>gauge, n</td>
<td>колея</td>
</tr>
<tr>
<td>- broad-gauge line</td>
<td>ширококолейная линия</td>
</tr>
<tr>
<td>- narrow-gauge line</td>
<td>узкоколейная линия</td>
</tr>
<tr>
<td>to generate, v</td>
<td>вырабатывать (энергию)</td>
</tr>
<tr>
<td>generation, n</td>
<td>выработка</td>
</tr>
<tr>
<td>generator, n</td>
<td>генератор</td>
</tr>
<tr>
<td>grade, n</td>
<td>подъем</td>
</tr>
<tr>
<td>gradient, n</td>
<td>уклон</td>
</tr>
<tr>
<td>heavy gradients</td>
<td>крутые подъемы</td>
</tr>
<tr>
<td>to handle the traffic</td>
<td>осуществлять перевозки</td>
</tr>
<tr>
<td>to haul, v</td>
<td>тянуть</td>
</tr>
<tr>
<td>haulage, n</td>
<td>тяга</td>
</tr>
<tr>
<td>hatch, n</td>
<td>люк, решетка</td>
</tr>
<tr>
<td>horse-power</td>
<td>лошадиная сила</td>
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<td>to house, v</td>
<td>размещать</td>
</tr>
<tr>
<td>input, n</td>
<td>вход</td>
</tr>
<tr>
<td>to increase, v</td>
<td>увеличивать</td>
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</tbody>
</table>
inductor, n  индуктор
install, v  устанавливать
installation, n  установка
instrument, n  прибор
insulation, n  изоляция
wire and cable insulation  изоляция провода
insulate, v  изолировать
interconnect, v  взаимосвязывать, объединять

jack, n  домкрат, стойка
jar, n  вибрация, дрожание
junction, n  узловая станция

length, n  длина
- total length  общая протяженность
level, n  уровень; рычаг
- level system  рычажная система
light, a  легкий
lighting, n  освещение
line, n  линия
- double-track line  двухпутная колея
- single-track line  однопутная колея
- transmission line  линия электропередач
- trunk line  железнодорожная колея
to load, v  грузить
local, a  местный
locomotive, n  локомотив
- diesel locomotive  тепловоз
- dual system locomotive  локомотив на две системы тока
- locomotive hauled train  состав
- steam locomotive  паровоз
locotractor, n  тяга
log, n  бревно
lower, v  понижать
lubrication, n  смазка
lumber, n  пиломатериал

machine, n  машина
machinery compartment  машинное отделение
main, a  главный
main line  магистраль
maintenance, n  обслуживание, текущий ремонт, эксплуатация
to maintain, v
maintenance of power supply devices
multiple unit manual, a
motor, n
- single-phase motor
- traction motor
to mount on, v
mover, n
prime mover

necessary, a
network, n
noise, n
non-ferrous, n
nuclear, a

to operate, v
operation, n
to put into operation
output, n
overhead line
overload, n
overvoltage, n
- overvoltage protection

parallel, a
to pay attention to
phase, n
pivot, n
plant, n
to play an important part
pollution, n
pollution-free
power, n
- motive power
- tractive power
- power set
- power source
- power supply system
- power plant
powerful, a

обслуживать, содержать
эксплуатация устройств
энергоснабжения
многосекционный
ручной
мотор, двигатель
однофазный двигатель
tяговый двигатель
устанавливать
dвигатель
основной двигатель

необходимый
сеть
шум
цветные металлы
ядерный

управлять, работать, действовать
управление
пустить в эксплуатацию
выход, выпуск
воздушная линия
перегрузка
перенапряжение
защита от перенапряжения

параллельный
уделять внимание
фаза
стержень, точка опоры
станция

играть важную роль
загрязнение
экологически чистый
энергия, сила
движущая сила
tяговая сила
энергетический блок
источник энергии
система энергоснабжения
электростанция
мощный
potential, n, a
pressure, n
primary, a
promising, a
property, n
to protect, v
protection, n
to pull, v
pump, n
punctured card
push-button, n
rail, n
- running rails
- third rail
railcar, n
railway, n
railway engineering
to refuel, v
relay, n
rate, n
rectifier, n
recuperation, n
to regulate, v
to repair, v, n
- heavy repair
- light repair
requirement, n
to resist, v
resistance, n
resource, n
- natural resources
right of way
rolling stock
roof, n
to rotate, v
rotation, n
to reduce, v
to run, v
to - run the locomotive
to - run the service
running, n

nапряжение, потенциал;
потенциальный
dавление
первичный
перспективный
свойство
защищать
защита
тянуть, тащить
насос
перфокарта
кнопка
релье
ходовые рельсы
контактный рельс
дrezина
железная дорога
железнодорожная техника
dозаправиться
реле, переключатель
скорость
выпрямитель
восстановление
регулировать
ремонтировать; ремонт
капитальный ремонт
tекущий ремонт
требование
сопротивляться, противостоять
сопротивление
ресурс
природные ресурсы
полоса отвода
подвижной состав
крыша
вращаться
вращение
уменьшать
двигаться, управлять, вести
управлять локомотивом
осуществлять перевозки
пробег
safe, a
safety, n
scale, n
on a large scale
in series
service, n
to put into service
set, n
shaft, n
sheeting, n
shunter, a
side track
sleeper, n
to slope down, v
sound, n
source, n
spur track
speed, n
- command speed
- speed limit
- operating speed
station, n
- hydropower station
- thermal station
- atomic station
stationmaster, n
strength, n
subganger, n
substation, n
- traction substation
suburban, a
subway, n
to support, v
suspension
switch, n
switching, n
switching duties
switch board, n
switchgear, n
telecommunication, n
terminal, n

S

безопасный
безопасность
масштаб
в большом масштабе
последовательно
эксплуатация, обслуживание
ввести в действие
агрегат
вал, ось
крепление
маневровый
запасный путь
шпала
опускаться
звук
источник
тупиковый путь
скорость
заданная скорость
ограничение скорости
эксплуатационная скорость
станция
гидроэлектростанция
тепловая станция
атомная станция
начальник станции
сила, прочность
помощник бригадира
подстанция
тяговая подстанция
пригородный
метро
поддерживать
подвеска, подвешивание
стрелка
перевод стрелок
маневровые работы
щит управления
коммутационное устройство

T

дистанционная связь
конечная станция, вокзал
tie, n

time-table, n

thyristor, n

top, n

torque, n

track, n

tractive effort

trailer, n

train, n

- fast train

- through train

- mixed train

- slow train

- wreck train

trainmaster, n

traction, n

to

- carry the traffic

- volume of traffic

to

transform, v

transformer, n

transmission, n

- transmission of power to trains

to

transmit, v

travel, n

traveller, n

tube, n

turnover, n

- freight turnover

- passenger turnover

turbine, n

underground, n

underframe, n

unit, n


to

unload, v

valuable, a

value, n

constant value

van, n

- baggage van

vehicle, n [viikl]
voltage, n  напряжение
wagon, n  грузовой вагон, фургон
- open-top wagon  полуwagon
weight, n  вес
wheel, n  колесо
yard, n  сортировочный двор
- frontier yard  пограничный передаточный путь
yardmaster, n  начальник станции
ABBREVIATIONS

a. c. (alternating current)  переменный ток
A. D. (Anno domine)  нашей эры
a. f. (as follows)  как указано далее
a. m. (above mentioned)  вышеупомянутый
a. m. (ante meridiem)  до полудня
Appx (appendix)  приложение
a/c (account)  счет
amt (amount)  количество
app (appendix)  приложение
asp (as soon as possible)  при первой возможности
at (atomic)  атомный
av (average)  средний
B. C. (before Christ)  до нашей эры
b. h. p. (British horse power/horse power)  брит. лошадиная сила /
B. R. (British Railways)  британские ж/д
brake  тормоз
Cf (compare)  сравните
cm (centimetre)  сантиметр
Co (company)  компания
C. to C. (center to center)  от центра к центру
c/s (cycle per second)  периоды в секунду
Cur. (currency)  валюта
CV (curriculum vitae)  краткая биография
C (century)  век
C (circa, лат.)  приблизительно
d. c. (direct current)  постоянный ток
dd (dated)  датированный
dd (delivered)  доставленный
deg. (degree)  градус
doc., dct (document) (docs)  документы
dia (diameter)  диаметр
el. loc (electric locomotive)  электровоз
E. g. (example)  пример
em. f (electromotive force)  электродвижущая сила
etc (et cetera), and so on  и так далее
fig (figure)  цифра; рисунок
Ft (foot, feet)  фут, фути
Frt (freight)  груз
ga (gauge)  ширина колеи
Gal. (gallon)  галлон (4.5 литра)
gm (gram)  грамм
GRP (glass reinforced plastics)  стеклопластика
hl (half)  половина
h. p. (horse power)  лошадиная сила
h. s. (high school)  средняя школа
hr (hour)  час
HSLT (high speed land transport)  высокоскоростной назем.
transport  транспорт
h. v. (high voltage)  высокое напряжение
hz (hertz)  герц
i. e., ie (id est, lat.)  то есть
in (inch)  дюйм (25,4 мм)
kg/m (kilogramme per metre)  килограмм на метр
km (kilometre)  километр
km/h (kilometre per hour)  километров в час
kw (kilowatt)  киловатт
kv (kilovolt)  киловольт
lb. (libra), pound  фунт (453,6 г)
loc. (locomotive)  локомотив
max (maximum)  максимум
min (minute)  минута
m. (mile)  мила
mph (mile per hour)  мила в час
m/s (meter per second)  метр в секунду
N.B. (nota bene, lat.)  обратить особое внимание
no (number)  номер
p. a. (per annum, lat.)  в год
par., para (paragraph)  абзац, параграф, пункт
p. c. (per cent)  процент
p. m. (post meridiem)  после полудня
R&D (Research and Development)  научно-исследовательские и опытно-конструкторские работы
ref (reference)  приписка
R. J. (road junction)  ссылка
R/R (railroad)  стык дорог
R-w, Rw, Ry, rly (railway)  железная дорога
p. mi (per mile)  на мило
r. p. m. (revolution per minute)  обороты в минуту
$ (dollar)  доллар
sq (square)  квадратный
sq. in (square inch)  
T (ton)  
V (volt)  
viz (videlicet, лат.)  
V. v. (vice versa, лат.)  
van (wagon)  
V (velocity)  
V, v (volume)  
VIP (very important person)  
w. g. (weight guaranteed)  
w. h. (watt hour)  
y. d (yard)  
& (and)  

квадратный дюйм  
тонна  
вольт  
а именно  
наоборот  
грузовой вагон  
скорость  
объем  
высокопоставленное лицо  
вес гарантирован  
ватт-час  
ярд (91,4 см)  
и
LITERATURE

Основная литература


Дополнительная литература


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Интернет-ресурсы

Учебное издание

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Дуисеева Алина Романовна
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АНГЛИЙСКИЙ ДЛЯ ИНЖЕНЕРОВ

УЧЕБНОЕ ПОСОБИЕ
по дисциплине «Английский язык»

Редактор Ф.А. Ильина
Компьютерный набор А.Р. Дуисеевой

Подписано в печать 07.05.2015.
Формат 60×84 ¹/₁₆. Печать офсетная.
Усл. печ. л. 8,75. Уч.-изд. л. 9,59.
План 2014 г. Тираж 200 экз. Заказ

Типография ИрГУПС, г. Иркутск, ул. Чернышевского, 15