АНГЛИЙСКИЙ ДЛЯ ИНЖЕНЕРОВ

МЕТОДИЧЕСКИЕ РЕКОМЕНДАЦИИ
по чтению текстов для студентов
2 курса (ЭПС, ЭНС, В)

ЧАСТЬ II

ИРКУТСК 2006
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Данные методические рекомендации являются структурным и содержательным продолжением пособия, изданного в 1999 году. Рекомендации дополнены гlosсарием и текстами для самостоятельной работы и рассчитаны на студентов, имеющих определенный лексический запас. Тексты связаны с профилем работы железнодорожного транспорта. Рекомендации помогут студентам углубить знания по своей специальности.

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Lesson 1

Model ER – 9P Electric Train

This serially produced train is designed for the transportation of passengers over suburban lines with gauge of 1,524 mm electrified with alternating current at 25,000 volts. Successful operation of the train is possible with fluctuation of the voltage in the system within +16 to –25% of the rated value. The contour of the train also allows it to be manufactured for 1,435 mm railways. The cars and their equipment are manufactured at enterprises outfitted with modern highly accurate equipment. Many years of experience and the high skill of the workers and engineers at these plants ensure a high quality of the rolling stock. The model ER – 9P electric train is a cheap and convenient means of transportation ensuring the rapid carrying of over a thousand passengers to the remotest suburban districts. The cars of the train are successfully adapted for the entrance and exit of passengers at stops having high or low platforms.

Their high speed, low cost of transportation, reliable service, attractive appearance and excellent interior furnish of the saloons together with other conveniences have given these trains a good reputation. Owing to the service properties and great conveniences the number of passengers preferring this type of transportation is growing every year. Depending on the volume of traffic, the trains can be made up of 10, 8 and 4 cars, including head, motor and trailer cars. The cars are connected by means of serial type CA–3 automatic couplers and have convenient through passages with safe inter-car vestibules. The motor cars of the train, which are the propelling units, carry the main traction and auxiliary equipment.

The light weight and strong body is welded of separate components and is a load-carrying member. The increased rigidity of the body together with a low weight are ensured by the wide use of bent and press worked sections. High-quality welding of the components is ensured by the use of modern automatic and semi-automatic welding machines with following weld control. The floor, walls and ceiling of the body have high-quality thermal insulation. Special coatings protect the body from corrosion. The body of a motor car is supported by two four-wheel motor-carrying pivot-type trucks with pedestal axle boxes. Owing to the use of soft central spring suspension, helical springs and also friction and hydraulic vibration dampers on the trucks, very smooth riding of the car is ensured.

Words to be remembered

1. Fluctuation — колебание
2. Contour — контур
3. Coupler — сцепка
4. Propelling — движущий
5. Vestibule — тамбур
6. Auxiliary — вспомогательный
7. To weld  сваривать
8. To ensure  обеспечивать
9. Rigidity  жёсткость, твёрдость
10. Pivot-type trucks  стержневые тележки
11. Pedestal axle boxes  подшипниковые коробки
12. Spring suspension  рессорное подвешивание
13. Helical springs  винтовые пружины
14. Damper  регулятор тяги, глушитель, амортизатор

Words to be reviewed
Gauge, suburban, alternating current, voltage, operation, cars, rolling stock, cheap, convenient, remote, high speed, low cost, reliable service, volume of traffic, traction, equipment, body, successful, friction.

Grammar:  1. Participle I, II.  

Exercises
I. a) Read the following words:
Serially, transportation, lines, operation, system, manufacture, modern, accurate, engineers, electric, passengers, adapt, stops, platforms, service, saloons, reputation, millimetres, automatic, vestibules, components, machines, control, thermal, insulation, corrosion, motor, type, central.

   b) Find in the text sentences with these words and translate them.

II. Choose from the text any sentences and ask your friend to complete and translate them (you may say the beginning or the end of the sentences).

III. Write out from the text sentences with Passive Voice and translate them into Russian.

IV. Make up general questions to the sentences with “to be, to have, modal verbs”.

V. Define the function of the verbs "to be" and "to have" in the following sentences:
1. This train is designed for the transportation of passengers.
2. This electric train is a cheap and convenient means of transportation.
3. These conveniences have given the train a good reputation.
4. The number of passengers is growing every year.
5. The floor, walls and ceiling of the body have a high-quality thermal insulation.
6. Before design work began certain requirements were to be laid down.
7. As modern transistorized base stations are reliable, no secondary system will have to be built in future.
8. Had the main network failed, the dispatcher would have switched over the secondary base stations to the frequencies of the main network.
9. The type of a locomotive radio to be described here has two receivers and a special change-over arrangement.
10. The problem to be solved must have been programmed.

VI. What are the functions of Participle I in the text?

VII. Make up general questions:
1. Successful operation of the train is possible with fluctuations of the voltage,
2. The train can be made up of 10, 8, 6 and 4 cars,
3. The high skill of the workers and engineers ensure a high quality of the rolling stock,
4. Conveniences have given the trains a good reputation,
5. The motor cars of the train carry the main traction and auxiliary equipment,
6. Special coating protects the body from corrosion,

VIII. Explain the function of "ed" in the following expressions:
This serially produced train; the train is designed; the cars are manufactured; the cars are adapted; the cars are connected; the increased rigidity is ensured; a motor car is supported; very smooth riding of the car is ensured.

IX. Answer the questions in writing:
1. What is this train designed for? 2. What are the cars of the train adapted for? 2. What has given a good reputation to this train? 3. What does the number of the cars depend on? 4. What carries the main traction and auxiliary equipment? 5. What is the role of the welding machines? 6. What ensures very smooth riding of the car?

X. Translate the following questions:
1. Этот поезд предназначен для перевозки пассажиров на пригородных линиях?
2. Где изготавливают вагоны и их оборудование?
3. Электропоезд модели ER–9P является дешёвым и удобным видом транспорта, не правда ли?
4. Высокая скорость, низкая стоимость перевозок, надёжное обслуживание обеспечили хорошую репутацию этим поездам, не так ли?
5. Поезда могут состоять из 10, 8 или 4 вагонов, не правда ли?
6. Что защищает корпус вагона от коррозии?
XI. Make up a short summary of the text.

XII. Prepare written translation of the text:

**Describing electric locomotive wheel arrangement**

The method of describing electric locomotive wheel arrangement is as follows. Letters are used to show the number of driving axles in each bogie (“B” for 2, “C” for 3, and so on.), and a small “o” after each letter shows that each axle in a bogie has its own motor. Thus, a locomotive with two two-axle bogies, all axles motor-driven, is a Bo-Bo, and one with two three-axle bogie is a Co-Co. Often the little “o” is left out because today axles are nearly always fitted with their own motors.

Some large locomotives have small guiding bogies as well as motor bogie and these non-motored axles are shown by figures instead of letters. A I-Co-Co-I, for example, is a locomotive with a single-axle guiding truck at each end, outside the two three-axle motor bogies.

When the motor bogie symbols are separated by a plus sign, it means that the coupling hooks and buffers are mounted on the bogie ends, the bogie being interconnected so that the tractive effort (“pulling power”) is transmitted through their frames to the train.

Examples of this arrangement are the Bo-Bo mixed traffic locomotives on the Manchester-Sheffield-Wath lines of British railways. The Co-Co express passenger locomotives on the same route are typical of the more usual arrangement, in which the couplings are on the main frame, to which the tractive effort is transmitted through the bogie pivots and then to the train.

Notes: Pivot — стержень, точка опоры.

XIII. Read the text and point out the main advantages of electrification:

**Chief attractions of electric traction**

Where once there were thick coal smoke blackened cars, stations and passengers, now high-speed electric trains are operating. The chief advantages of electrification are two in number. One is the great rapidity of acceleration from a dead stop. It is this, rather than higher maximum speeds, that has accelerated the introduction of electric working over suburban routes. The power of the electric locomotive at lower speeds is very great; further than this, motors can be distributed throughout the train – this is known as "the multiple-unit" system of working – all under the control of one motorman. The power thus available makes possible very rapid starts from each of the frequent stops of a suburban route, making, in this way, substantial cuts in the overall time of suburban journeys, so that the improvement of the service from the passenger's point of view is likely to attract traffic to the route. Besides, the higher average speed makes it possible to crowd trains more closely, increasing the railway
carrying capacity, and this may do away with the necessity of track doubling in
order to accommodate an increasing traffic.

The second great advantage is that the electric locomotive is always ready
for service, and can remain in operation for practically the whole of twenty-four
hours continuously, apart from a brief time that may be needed for daily
examination.

Although of minor importance but economically attractive is freedom
from smoking, gas and fire hazard which makes electricity the choice for
tunnels, terminals and timber land. No wonder, around the world, on every
continent, electric railways perform valuable service.

XIV. Reproduce the dialogues:
a) - Will you show me your tickets?
   - Here they are.
   - How many places of luggage do you take?
   - This is all we have with us.
   - Did you have any of your heavy luggage registrated?
   - No, I didn’t, why should I have my luggage registrated?
   - Sorry, but you are permitted to carry thirty five kilograms of hand
     luggage per ticket.
   - I see. What shall I do?
   - Let the porter have your trunks labeled and put in the luggage van.
   - I’m afraid we have very little time left.
   - Take your time. You’ll make it.
   - Thanks.
   - Mind you take the luggage receipt with you.
   - I will, thank you.

b) - Show me your ticket, please.
   - Here you are.
   - Have you got your luggage receipt?
   - No, I needn’t any. I travel light. But where is my handbag, I wonder. No
doubt, I left it behind in the hotel.
   - Take it easy. Let them know your address and they’ll have it forwarded.
   - Thank you, you’ve been very helpful.

Notes:
1. luggage receipt — багажная квитанция
2. to travel light — путешествовать налегке
3. to leave behind — оставить, забыть
4. They’ll have it forward — они перешлют
Lesson 2

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
5. Laid out flat
6. Propulsion
7. Cushion
8. Friction
9. Suspension
10. Silent
11. Extremely
12. Mph

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 Peters burg.
   b) Were the train speed 300 kph passengers would spend only 2 hours to get from Moscow to Peters burg.

   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. 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 records 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 turbo-train?
   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.

**III. Define the function of the verb "to be" in the sentence:**
The total weight of the turbostrain is to be only half that of a conventional train of the same length.

**IV. 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 words with the ending "ing" 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 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. 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.

IX. Translate paragraphs 8, 9 in writing.

X. Make up a plan of the text.

XI. 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. Поезда 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.

XII. 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?

XIII. Give a technical description of:
a) turbotrains; b) the air-cushion system and the magnetic suspension system.

XIV. Read this text and retell it in Russian:

The Corridor System

The "Corridor system" was proposed to provide intercity passenger service between Boston and Washington for several thousand passengers an hour. The "Corridor" design was based on a few simple calculations.
The average speed along the "Corridor" must be at least 200 mph. Time must be provided for a few intermediate stops in Boston, New York and Washington. So maximum speed must be something over 400 mph. To attain such high speeds the train should be protected from ice and from objects falling into its path. That's why the vehicle should travel in a tube.

In order to eliminate air friction, most of the air should be pumped out of the tube. For heavy, continuous traffic a pair of tubes is needed. The air at atmospheric pressure should be admitted behind the train to accelerate it through the evacuated tube; similar pneumatic effects can decelerate the train to stop. A reasonable degree of straightness would call for large numbers of bridges or tunnels. One should therefore consider putting tubes in a tunnel all the way. Each train would be half a mile long and would run on steel rails. The system proposed would offer a number of economic benefits in addition to convenience of travellers.

XV. Translate the text with a dictionary (50 min):

**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.

XVI. 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.
6. It is possible to use the Maglev train everywhere.
7. 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 does not have any wheels. 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, quiet 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 build. 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.

XVII. 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.
Lesson 3

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 expresses 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 programme 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 min. 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 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
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<td>9. To determine</td>
<td>определять</td>
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<td>10. Emergency braking suspension</td>
<td>аварийное тормозное подвешивание</td>
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<td>11. Influence</td>
<td>влияние</td>
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<td>12. Strip</td>
<td>полоса, лента</td>
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<td>13. To ensure</td>
<td>обеспечивать</td>
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<td>14. Gap</td>
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<td>15. Effort</td>
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<td>16. Obvious</td>
<td>очевидный</td>
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<td>17. To estimate</td>
<td>подсчитывать</td>
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<td>18. Fertile</td>
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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).
2) Equivalents of the modal verbs “can” and “must”.

Exercises

I. a) Translate these words:
Limit, population, tempo, magnetic, ecologically, transport, distance, type, programme, 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 programme 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, impossible, the, of, track, the, of, shortness.
3) growth, population, mobility, its, tempo, of, the, life, requires, speeds,
greater, transport, ground, from.
4) coach, the, moves, which, line, motor, electric, the, of, part, rotor, the, is,
this.
5) 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. Define the type of the conditional sentence and add two more types:
The velocity will be possible, if the wheel is replaced with an air or magnetic
cushion.

IX. Translate the following questions and ask your fellow students to
answer them:
1. К какому заключению пришли ученые и инженеры?
2. Что они предлагают?
3. Смогут ли эти экспресссы развивать скорость до 500 км в час?
4. Окупится ли стоимость строительства такого вида транспорта?
5. Кто провел большую научную работу?
6. Сколько экспериментов провели наши специалисты?
7. Преимущества высокоскоростного наземного транспорта очевидны, не так ли?
8. Дороги и аэрродромы занимают тысячи гектаров плодородных земель, не так ли?

X. Make up a plan of the text. Retell the text according to your plan.

XI. Render the text in English and give it the title:

Этот поезд осуществляет перевозки пассажиров между двумя главными городами России за четыре часа со средней скоростью свыше 160 км в час. Он состоит из вагонов, которые тянет локомотив с двумя парами двухосных тележек. Мощность составляет 8400 киловатт и нагрузка на ось 19 тонн. При испытании этого поезда большое внимание уделялось тяговым моторам и электрооборудованию. Ученым пришлось доказывать надежность электронных устройств, применяемых для управления тяговой силой и торможением.

Снижение нагрузки на ось при высокой скорости было одной из главных задач. Для кузова вагона применяли легкие сплавы алюминия. Было необходимо сохранить нагрузку на ось до 17 тонн, это означало (to mean), что самый тяжелый электрический вагон не должен весить более 61 тонны. Для отправления поезда и для реостатного торможения применяют обычное сопротивление (resistance). Все 8 моторов соединены последовательно; и их переключают на 2 параллельные группы при возрастании скорости. Автоматическое оборудование поддерживает скорость постоянной.

XII. Speak on the main principle of magnetic suspension.

XIII. Read the joke. Have you ever been in similar situation?

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”.

Lesson 4

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
   Seating accommodations
   Sleeping accommodations
2. Paying load
3. Empty
4. Upholstery
   Upholstered car
5. To govern
6. To vary
   Various
   Variety
7. Complicated
8. To take into account
9. Particular
10. To fulfill
11. In case of
12. Amount
13. Roomy
14. Versatility
15. Suitability

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. The equivalents of “must”.
3. 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
так далее; способность вагона перевозить большое количество груза,
мягкий вагон для поездов дальних следований, 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 is 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 (влажа) 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 are 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. Give a title to the text:

After preparing the cars and cleaning and stocking them with supplies, they are coupled, inspected, and tested to ascertain whether mechanical appliances such as air brakes and signal lines are functioning properly. Passenger trains are assembled in car yard with a specified number of cars as baggage, mail and express, coaches, dining, parlor and sleeping cars. When ready, a switching engine moves the train to the assigned departure track at the station. The road locomotive has been inspected.

The road engine crew takes over the locomotive at the engine terminal, moves it to the departure track and couples it to the train. Here, again, the train receives terminal tests of air brakes and signal lines. The train crew has been mobilized. They are called for duty according to schedule, and report a specified number of minutes before the departure of the train. The train is now ready to receive its passengers, baggage and mail.

XIV. Reproduce the dialogue:

Travel agent: Good afternoon. Can I help you?
Lesson 5

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
2. Frame
   Underframe
3. The ends of the car
4. All-metal
5. Seating capacity
6. To rust
7. To resist corrosion
8. Corrosive cargo
9. Anti-corrosiveness
10. Alloy
    Alloy steel
11. Stainless
12. Tare weight
13. Axle
    Axle-load
14. To ensure
15. To lead (led, led) (to)
16. Drawback
17. To paint
18. To affect
19. Property
20. To give savings

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

Grammar: 1. Participle I.
   2. Subjective Infinitive Construction.

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… .
   1. Being unaffected by rust… .
   2. Moreover, being heated with… .
   3. The principle type… .
   4. Plastics reduce the weight… .
   5. 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. Translate the sentences with Participle I:
1. The railway vehicles being built today are manufactured of steel, aluminium and plastics.
2. Being a light weight metal, aluminium ensures great savings in tare weight.
3. Being affected by rust, ordinary steel is replaced by alloy steel in the construction of cars.
4. The next most important development in railway cars being specialization, we have now freight cars for heavy kind of traffic.
5. Nearly all open freight cars being now manufactured have bodies made wholly of steel.
6. The vehicles have been substantially improved, the most important advance being the substitution of steel, aluminium and plastics for wood in their construction.

VI. Find in the text sentences with Participle I and with Subjective Infinitive Construction.

VII. 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?

VIII. Prepare back translation of the 3\textsuperscript{rd} and 4\textsuperscript{th} abstracts of the text.

IX. Make up written translation of the text:

Application of plastics in rolling stock

Many years ago rolling stock engineers paid attention to some properties of plastics in construction of different types of vehicles. It must be appreciated that the properties of plastics cover a wider range than is covered by a group of traditional materials such as wood, non-ferrous and ferrous metals. Plastics have properties of particular value in rolling stock construction. Some of the more significant of these are: resistance to corrosive atmospheres, lightness, high strength, ease of manufacture and repair, thermal, sound and electrical insulation.

In appearance, the new vehicles do not differ greatly from other vehicles but in fact only a small proportion of the traditional construction is incorporated. The bodyshell is composed of longitudinal sections, each consisting of a sandwich construction with outer skins of aluminium and polyurethane foam.
core. The method of manufacture is to adhere glass fibres to the inner faces of the aluminium sheets, hold these in a mould and pour in a liquid polyurethane resin mixture. The bodyshell is thus light in weight, strong, rigid and thermally and acoustically insulated. The manufactures estimate this method of construction to give a bodyshell 50 per cent lighter. Additional uses for plastics in these particular vehicles include luggage rack frames, window frames and interior panelling.

Notes:
1. sandwich construction  слоистые конструкции
2. polyurethane foam core  сердцевина состоит из полиуретановой пены
3. liquid resin  жидкая смола
4. luggage rack frames  рамки для багажных сеток

X. Read the text and 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 birth is?
- Here it is. The upper birth, please.
- May I occupy the lower one, please? Is it vacant?
- Sorry but you can’t. It is reserved.
- I see.

XIII. Have 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”.

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”.

Lesson 6

Passenger train 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 streamliners 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
2. To mount upon
3. Flanged wheels
4. To resemble
5. Luxurious
6. To accomplish
7. Elimination
8. Streamlined car
9. Truck
10. To articulate = to connect
11. As far as concerned
12. Furnishings

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: Functions of "ed".

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:
Стандартное оборудование, цельнометаллические вагоны, спальный вагон, поезд-экспресс, пассажирские поезда облегчённой конструкции, нержавеющая сталь, усовершенствование в конструкции тележек.

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 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 31\textsuperscript{st} 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 31\textsuperscript{st} 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 signalling worked by electric circuit which is operated by the trains themselves. A programme 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. Find in the text derivations of the following words and define their part of speech:

to extend to connect to combine

to enter to vary to resist

to collapse to accommodate to lead

**British Main-line Rolling Stock**

British main-line rolling stock is built with two types of inside arrangement. One is the compartment type with a side corridor and the other the open vehicle, without compartment partitions, and having a central gangway. In both cases the corridor or gangway leads at each end into a vestibule extending across the coach. The ordinary side entrance doors through which passengers board or leave the carriage open into this end vestibule, and there is also an end
door through which passengers can walk over a small platform into the next coach. The platforms are protected by collapsible covers which can be pulled out or folded back on the bellows principle. When two corridor coaches are coupled together, their "bellows" are extended and joined to one another so as to form a "tunnel" from carriage to carriage. On the last coach of a corridor train, of course, the corridor connection is folded back and the door leading to it is locked. Carriages of both types may be all first class, all second class, or a combination of the two, in which case they are called "composites". Another variety is the vehicle with guard's and luggage compartments as well as passenger seating. This is called a "brake second" or "brake composite" according to the type of accommodation for passengers. All the interior materials are fire resisting.

XIV. Reproduce the dialogue:
- How do you do?
- How do you do?
- I say, yours is the lower birth 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.

Lesson 7

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, powered 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. It is much cheaper to ship large quantities of valuable bulk materials in these cars than to place the materials in bags and ship the bags in the box cars as was done many years ago.

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
   To unload — разгружать
8. To reduce = to decrease — уменьшать
9. Bottom — дно
10. Box car — крытый грузовой вагон
11. Gondola car — полувагон
12. Hopper car — вагон-хоппер (полувагон с разгрузочным люком в полу)
13. Contents — содержимое
14. Bulk — большое количество, большие размеры
15. Water-tight = water proof — водонепроницаемый
16. To slope down  опускаться
17. Hatch  люк, решетка
18. Valuable  ценный
19. Double-deck  двухъярусный

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

2. 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.

III. 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) 5. The bridge connecting the old and the new parts of the town shouldn't have been so narrow. 6. To avoid the accident on the dangerous section of the line the driver ought to have been more careful. 7. Taking into consideration all the drawback of the machine the tests ought to have been carried out on a large scale. 8. 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) 9. An extensive mechanization might have speed up the electrification of the first railways. 10. Without the steam locomotive we might not have had the highly developed railway network of today. 11. A small marshalling yard could not have sorted so many wagons a day without having been modernized. 12. 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 and translate the text:

**Wagon-cleaning system**

The mechanical cleaning system, which deals with 200 railway wagons a day, was built for the great Northern Railway Company's yard in Everett (USA).

The highly-automatic system requires a crew of only six men on each shift, although the system is designed principally for box wagons, it is also used for washing high-side and hopper-bottom wagon. This wagon-cleaning system is known to have three storage tracks for approximately 100 wagons converging on to a single wagon clean-out track. A wagon-puller draws a train of 35 wagons at a time into the clean-out area.

Three men are required per shift to prepare the wagons for cleaning, two to operate the giant vacuum cleaner and shuttle conveyor and one man for the automatic washing equipment. All functions are controlled from one of two central panel boards. Buttons are used to sound a warning signal, start up the wagon-puller tow cable and its haul-back line, operate the conveyors, start and stop the vacuum cleaner and position the radial stacker over one of the incinerators. All facilities are electrically interlocked.

Wagons are pulled into the cleaning area and moved from one cleaning station to the next by a single-drum wagon-puller with a 30 b. h. p. motor which provides a starting rope pull of 20000 lb. and a running pull of 10000 lb. After vacuuming, the wagon is moved forward one length to the washing station. Here
an operator pushes a button, and the washer which is attached to a telescoping boom, enters the door. When the washer is in the centre of the wagon, the water automatically turns on, past revolving sprays washing the interior.

At the washing station, the wagons are located at the top of a hump track. Wagons needing further steam cleaning, are certain to be released to a steam-out track, and wagons requiring light yard repairs are dispatched to a repair area.

This system provides well-cleaned wagons, at low labour cost.

Notes:
1. High-side wagon
2. Hopper-bottom wagon
3. Storage track
4. Vacuum cleaner
5. Shuttle conveyor
6. Puller
7. Tow cable
8. Stacker
9. Incinerator
10. Drum
11. b.h. p.
12. Telescoping
13. Boom

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

прибытие
регистрация багажа
получение багажа
прокат багажных тележек
регистрация
только для пассажиров первого класса
внимание
не сорить
штраф 50 долларов
стойте (на светофоре)
идите (там же)
личные вещи (багаж)
автобусная остановка
выход к автобусу
объезд
обгон запрещен
железнодорожный переезд
кольцевое движение
автомагистраль
XII. 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?

Lesson 8

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)  зд. помещать
12. Truck  грузовой автомобиль, платформа, багажная тележка,
13. Warehouse  товарный склад
14. 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.

Grammar: The Subjective Infinitive Construction.

Exercises
I. Read the following words and translate them in Russian:
Container, standard, station, transportation, cement, active, elastic, industry, service, manufacture, materials, operation, control, automatic, acceleration, mechanism, modification, assortment.
II. Give written translation of the following combinations:
Movement of freight, additional fittings, final destination, freight stations, valuable goods, considerable increase, average capacity containers, container building industry, high capacity containers, special high-speed container trains, smooth acceleration, modification of a container fleet, according to strict schedule.

III. Translate the sentences paying attention to the words "that" and "it":
1. The number of cars forming a passenger train is much less than that of a freight train. 2. It is important to keep equipment moving over the track in good physical conditions. 3. The early freight car was little more than a box on wheels, it carried from one to three tones of freight. 4. It was in 1966 that the first container ship arrived in Bremen. 5. The great difference between the earliest trains and modern ones is that the former had no sleeping cars. 6. At that time they were busy at the laboratory. 7. It was reported that multiple wheel cars would have a bright future. 8. There are several technical requirements that any locomotive has to meet. 9. The efficiency of steam locomotives was not so high as that of diesels. 10. That the device stopped working surprised everybody. 11. Give us a material that can withstand very high temperature. 12. That was the thing he wanted.

IV. Review the meaning of the composite prepositions:

because of — из-за
due to — благодаря
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 (гибкий шланг). 9. Because of the growth of train loads and speeds railways constantly improve the stability of the track.
V. Translate the sentences with the Subjective Infinitive construction 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 (силконовые выпрямители). 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.

VI. Read and translate the text.

VII. Complete the following sentences:

a) 1. These containers …
2. The containers …
3. The container car …
4. Many bricks are …
5. High-capacity containers …
6. It must be …
7. The loading …
8. A new branch …

b) 1. … the container car.
2. … for attaching of containers.
3. … and carried to final destination.
4. … of valuable goods.
5. … of milk and cream.
6. … in carrying goods.
7. … on constructing high-capacity containers.
8. … handle the average-capacity containers.

c) 1. … can be packed into a flat car …
2. … the work of loading and unloading …
3. … will be accomplished by …
4. … will play an active part …
5. … with semi-automatic control …
6. … as well as combined stations …

VIII. Prepare back translation of the third paragraph.

IX. Find in the text sentences with the verbs "to be" and “to have” and explain their functions.

X. There are 2 sentences with Complex Subject in the text. Find them.

XI. Make up all types of questions to the following sentences:
1. Another type of a car is the container car.
2. Containers may be lifted from the car.
3. The container car reduces the work of loading and unloading.
4. Many bricks are shipped in container cars.
5. High-capacity containers will play an active part.
6. An automated container traffic control sub-system should be provided.

XII. Translate the following questions into English and answer them:
1. Какие вагоны называют контейнерами? 2. Где загружаются контейнеры?
3. Какую работу может облегчить контейнерный вагон? 4. Какие виды грузов перевозят в контейнерных вагонах? 5. Как будет осуществляться доставка контейнеров?

XIII. Speak on the advantages of container traffic according to the plan:
1. Some features of the container car.
2. Their role in the work of freight stations.
4. Types of container cars.
5. The loading and unloading of the containers.

XIV. Read and say what additional information on containers you have got?

Expanding container traffic

An important means of ensuring highly efficient freight traffic system is the forwarding of goods in containers. Taking account of this, the container fleet is being enlarged, new container sites are put into operation, many industrial enterprises use not only general type container but also specialized ones, they are building their own container sites.

Container traffic is economically most efficient. Containerization facilitates the automation and mechanization of freight traffic, especially the forwarding of goods requiring packing.

Containerization causes an increase in railway operation expenditures though, such as extra expenditures needed to build both container sites and
containers, to operate and maintain them, to move empty containers, to operate and maintain specialized rolling stock. However, due to savings on packing materials and on warehouses and also due to mechanizing loading and unloading operations the one-time investment in containerization pays back in 1 or 1.5 years. The rate of containerization is growing: new containers are being manufactured and the whole container system is being expanded. An objective has been set to divert a maximum amount of goods from box wagons to containers.

XV. Reproduce the dialogues:
- Here we are!
- How do you do?
- How do you do?
- Will you please make room for me?
- All right. Need any help?
- It would be very kind of you. Hold this hand-bag of mine for a moment, will you?
- Certainly.
- Thank you.
- It’s rather stuffy in the compartment, isn’t it?
- Well, yes. I think so.
- Will you switch on the ventilation?
- That’s all right. I’ll switch it on right away.
- Thank you.

Lesson 9

Freight and passenger car trucks

The important parts of a railway vehicle are the body and the running gear. The body carries the load of the freight and the running gear is the trucks or bogies which the body rests upon. Each car normally has two trucks. The most common freight and passenger car truck has four wheels though six and even eight-wheel trucks are seen.

The four-wheel truck consists of two wheel sets, a pair of side frames, a truck bolster with a center pin, and spring suspension; the wheel set, in its turn, consists of two wheels, an axle and axle boxes, also known as journal boxes.

Unlike the wheel of an automobile, which are known to turn upon their axles, the car wheels are fastened rigidly upon their axles, and they turn as the axle turns.

The ends of an axle extend out a few inches from the wheel. These extended parts of an axle are called the journals. The journals are considered to be important elements of an axle for it is upon the journals that the weight of the car is carried, being transmitted to the axles through the side frames.
The journal is surrounded by the journal box. The function of the journal box is to keep the bearing clean and to hold oil-soaked cotton waste which lubricates the journal.

Placed across the truck between the side frames is the truck bolster. It is rigidly fastened to the side frames but rests on springs set into the side frames which can move in relation to each other to some extent, such a truck is called a self-aligning truck.

The trucks or bogies of a passenger car are sure to be a bit more complicated than those of a freight car. The bogie frame is free to move to some extent independently of the car underframe. On many trucks rubber pads in addition to springs are used to further cushion shocks transmitted by the wheels. Hydraulic shock absorbers similar to those employed in automobiles are also installed in most passenger car trucks and contribute a good deal to smooth and steadily running. The bogies of modern passenger and freight cars give a very satisfactory dynamic stability even at high speeds.

Words to be remembered

1. Oil-soaked cotton waste — пропитанная маслом набивка
2. Running gear — ходовая часть вагона
3. Truck = bogie — тележка
   Truck bolster — надрессорная балка
   Self-aligning truck — саморегулирующаяся тележка
4. To carry a load — нести нагрузку
   Load-carrying (body) — несущий (кузов)
   Load-carrying sheathing — несущая обшивка
5. Wheel set — колесная пара
6. Side frame — боковина (рамы)
7. Center pin (pivot) — шкворень
8. Spring — рессора, пружина
   Spring suspension — рессорное подвешивание
9. Rubber pad — резиновая прокладка, амортизатор
10. Hydraulic shock absorber — гидравлический амортизатор
11. Cushion — подушка, смягчать
12. To fasten — закреплять
   To fasten rigidly — зд. насаживать прочно
13. To lubricate — смазывать
15. To depend (on, upon) — зависит от
   Independently of — независимо от
16. Flexible — гибкий; упругий
   Flexibility — подвижность
Words to be reviewed
Important, to consist of, wheel, axle, complicated, passenger car, freight car, to transmit, to install, a good deal, modern.

2. Inversion.

Exercises
I. Read the text without a dictionary (5 min) and name the main parts of a railway vehicle, a car truck and a wheel set.

II. Arrange the synonyms in pairs:
1. haul a. speed
2. though b. kind
3. rapidly c. although
4. carry out d. fulfill
5. freight e. goods
6. type f. quickly
7. rate g. haulage
8. traction h. carry

III. Arrange the antonyms in pairs:
1. low a. narrow
2. rapid b. decrease
3. increase c. impossible
4. wide d. slow
5. internal e. external
6. possible f. high

IV. Complete the sentences (in writing):
1. The body of the car rests upon … .
2. The wheel sets and the side frames with the truck bolster form… .
3. The extended parts of an axle are known as… .
4. The journals are surrounded by… .
5. The weight of the car is transmitted to the car axles through… .
6. The beam extending across the truck and resting on the springs is called … .
7. In the middle of the truck bolster there is an opening for … .
8. The devices cushioning the shocks received by the wheels from the track are known as… .
9. The sheathing of a railway vehicle carries the load of the freight and is known as … .

V. Agree or disagree:
1. Each car normally has three trucks.
2. The body carries of the load of the freight.
3. A wheel set consists of four wheels.
4. The four wheel truck consists of two wheel sets, four side frames and two bolsters.
5. The journals are thought to be very important element of an axle.
6. Hydraulic shock absorbers don’t contribute to smooth and steady running.
7. The trucks of a passenger car are a bit complicated than those of a freight car.

VI. a) Pay attention to the word order and translate the sentences:
1. Placed at the floor level are the outlets which supply the compartments with fresh clean air.
2. Set on the side frames are the springs which support the truck bolster and provide a smooth running of a vehicle.
3. Arranged on the journals are the axle boxes which protect the journals from dirt and damage.
4. Fastened rigidly upon the axles are the wheels which turn as the axle turns.
5. Arranged in the center of the platform is the lower part of the flat car which accommodates such bulky loads as generators, transformers, turbines, etc.

b) There is one sentence of the same structure in the text. Find it.

VII. Define the function of the infinitive:
1. A long freight train can carry several thousand tons.
2. To haul such a gigantic load may require several locomotives.
3. The design of the body frames makes it possible for the body to be lifted with all its equipment by means of four jacks (домкрат).
4. There are many considerations to be taken into account in designing a rolling stock.
5. To cushion shock from the track and reduce the track noises there must be rubber pads in addition to shock absorbers.
6. The materials to be used in building cars comprise alloy steel, cast iron, aluminium alloys, plastics and other materials.
7. To considerably increase the seating and carrying capacity of carriages and wagons the weight of the empty vehicle must be reduced to a minimum.
8. To reliably protect the goods in transit some of the box cars are fitted with special load fastening devices.
9. The weight of the vehicle is a factor not to be neglected by the designers.
10. To be regularly oiled is essential for the bearing (подшипник) to have a long service life.
11. The passenger cars to be used in super high-speed trains are expected to be equipped with fast-acting electro-pneumatic brakes.
12. High-capacity wagons are considered to be all fitted with six- and eight-wheel trucks.

VIII. Put all types of questions to the following sentences:
1. The important parts of a railway vehicle are the body and the running gear.
2. The four-wheel truck consists of two wheel sets.
3. The journal is surrounded by the journal box.
4. The side frames can move in relation to each other to extent.
5. The bogies of modern passenger and freight cars give a very satisfactory dynamic stability even at high speed.
IX. Find in the text sentences with Subjective Infinitive Construction.

X. Render in English:
1. Динамическая устойчивость вагона зависит от конструкции тележки. 2. Боковины рамы могут до некоторой степени перемещаться относительно друг друга. 3. Маневренность поворотной тележки – очень важное свойство. 4. Рессоры, амортизаторы и резиновые прокладки обеспечивают плавное движение вагона, так как поглощают удары, передаваемые колесами от пути. 5. Колеса вагонов жестко насажены на оси. 6. Рессоры делают движение вагона плавными, независимо от состояния пути. 7. Кузова железнодорожных вагонов имеют несущую обшивку. 8. Тележка оснащена пружинящей подвеской. 9. Это – тележка с независимой подвеской.

XI. Read the text and answer the questions:
1. What is the function of the body?
2. What does the running gear consist of?
3. What parts of a railway vehicle provide its dynamic stability?
4. What trucks do railway cars usually have?
5. What makes the wheel sets of railway cars different from those of automobiles?
6. What do we call the extended parts of an axle?
7. Why is the journal a very important element of a railway truck?
8. What is the journal surrounded by?
9. What are the characteristic features of a self-aligning truck?

XII. Name all the necessary words you need to describe freight and passenger car trucks (work in pairs).

XIII. Look through the text. Prepare its written translation.

New passenger car truck

New passenger trains of increased capacity are reported to have been introduced on Australian railways to cope with the increasing traffic volume. There are eight-car trains providing comfort conditions for passengers. One of the main features which contributes a great deal to comfort is sure to be a new type of bogie. Conventional bogies have been replaced by new ones of direct-suspension type in which the whole car is supported directly by the air springs. The body is of aluniumn construction, but the bogies are made of cast iron. This combination has greatly reduced the overall weight of the car as a whole.

XIV. Render the text in English:
Французскими железными дорогами были разработаны различные варианты тележек для пассажирских вагонов. Сравнительные (comparative)
испытания этих тележек привели к созданию тележки, предназначенной для движения со скоростью выше 200 км/ч независимо от условий пути.

Рама тележки, на которой покоится кузов вагона, имеет две боковины, связанные между собой двумя поперечными балками (cross beams). Нагрузка от кузова передается на рессоры через надрессорную балку, которая вмонтирована в раму кузова и поэтому не может поворачиваться относительно последнего (latter).

Специальные звукоизолирующие (sound-proofing) резиновые подушки прикреплены между надрессорной балкой и кузовом. Эти подушки также принимают на себя удары от колес и, поглощая их, обеспечивают плавный ход вагона. На тележке установлена пружинящая подвеска. Рама тележки изготовлена из прочной стали.

XV. Reproduce the dialogue:

**THE 10 O'CLOCK to LONDON**

*Ann:* Do we have to go to the railway station to buy tickets?

*Steve:* We can book them any time at the nearest travel agency. In fact, we can get them tomorrow just before getting on the train.

*Ann:* Everything will be booked up by tomorrow, don't you think so?

*Steve:* Tickets aren't a problem with so many trains going to London. Well, let's book them today to be on the safe side.

*Grandpa:* Let me have a look at the timetable. I'd recommend going by the 10 o'clock in the morning. It's a high-speed train taking you to London in no time. It has just two stops, at Canterbury and Chatham.

*Steve:* Good.

*Grandpa:* Speaking of trains, have you read "The Mystery of the Blue Train?"

*Ann:* I have. As far as I remember, they got on the train in London and went to the Mediterranean and that woman was murdered in her compartment at night. At that time they were taken across to France on a train-ferry, weren't they?

*Grandpa:* The events in the story took place in the thirties and ferries were introduced later, after the Second World war. The people in the novel took a boat-train from London to Dover first. They arrived here and then crossed to Calais by boat. It was at Calais that they got on the Blue Train for Nice. Today, you get on a through train in London and it takes you straight to France through the Tunnel and in three hours you are in Paris.

XVI. 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.

XVII. 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. I think it’s great. I hate traveling by sea. I always feel seasick. Now, with the tunnel, I can travel by train.

XVIII. It’s interesting to know:

Making the tunnel

The Channel tunnel is one of the most incredible pieces of engineering. It opened in 1994 after six years of work. To build the tunnel, they used giant drills from both France and England. These special drills moved slowly underground and put up the walls of the tunnels and put down the train tracks at the same time. The French engineers took their drill out when the work was finished. The English engineers left their drill inside the tunnel. It was too expensive to take it out.

Le compromise

One small but remarkable success of the Chunnel (the Channel tunnel) enterprise seems to be linguistic. You might think that there would have been some argument. Which language would be used to talk about the Chunnel and things connected with it? English or French? No problem! A working compromise was soon established, in which English nouns are combined with French words of other grammatical classes. For example, the company that built the Chunnel is called Trans-manche Link (la Manche is the French name for the Channel), and the train which carries vehicles through the tunnel is officially called Le Shuttle.

This linguistic mixing quickly became popular in Britain. On 12 February 1994, hundred of volunteers walked the 50 kilometers through the Chunnel to raise money for charity. The Daily Mail, the British newspaper that organized the event, publicized it as “Le walk”, and the British media reported on the progress of “Les walkers”.

<table>
<thead>
<tr>
<th>We talk about “the Channel Tunnel” but, in fact, there are three tunnels, not one. There are two tunnels for trains and one service tunnel.</th>
<th>Maximum speed of trains in the tunnel:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>130 km per hour for car trains</td>
</tr>
<tr>
<td></td>
<td>160 km per hour for passenger trains</td>
</tr>
<tr>
<td>Cost: $ 15 000 000 000</td>
<td>Journey time in the tunnel: 21 minutes</td>
</tr>
<tr>
<td>Size: 50 km long (total) 130 m under the sea</td>
<td>Passengers in each train: 800</td>
</tr>
</tbody>
</table>
Lesson 10

Solid and roller bearings

The solid journal bearings have been used for many years by railroads. But as they have a number of disadvantages they are being replaced by roller bearings even on freight cars. The worst drawback of solid bearings, as you must have read, is their tendency to overheat. When the bearing becomes too badly overheated the waste and the oil in the journal box catch fire and cause what is known as a “hot box”.

Another disadvantage of the solid bearings is that the friction between the solid bearing and the journal is much higher than with the roller bearing. Furthermore, the solid bearing is greatly affected by temperature. It means that it takes a lot more tractive effort to start a train with solid bearings than it does with roller bearings. Besides, the oil in a journal box becomes so thick in cold weather that it may take as much as 25% more tractive effort to haul a train in winter than it does in summer.

As a result, all modern passenger and freight car axle boxes are now equipped with roller bearings. Roller bearings are known to have been first introduced for traction motors. It was as early as 1900, but it was only after 1920 that the roller bearings were universally excepted. It was because little was known of the roller bearings in those days.

Developments in bearing technology and the experience gained showed that it was thanks to the application of roller bearings that the reduction of bearing wear could be attained. Roller bearings are found to run for a long time without a considerable wear if they are correctly lubricated. They are lubricated with grease instead of oil and can run thousands of miles without relubrication.

Hot boxes are almost unknown with roller bearings and bearing friction, particularly in starting, is much lower than that with solid bearings. Another benefit is that the friction of roller bearings changes very little with changes in temperature. Many passenger cars being built have a device that warns the driver should the car develop a hot box. A small electric thermometer installed in each journal box causes the buzzer to sound and a light to flash should the journal box become too hot.

Words to be remembered

1. Solid bearing
2. Roller bearing
3. Hot box
4. Wear
5. Benefit
6. Overheat
7. Cause
8. Universally
9. To accept

podshishnik skolyzhzenia
podshishnik kachenia
peredreby bukсы
iznos
preimushchestvo
peredrebyatsya, peredereb
vyzyvat', prichina
povesmenno
prinimat', priznавать
9. Gain experience
10. To reduce
11. To attain
12. Considerable
13. Instead of
14. Grease
15. To warn

Words to be reviewed
Friction, tractive effort, tractive motor, capacity, advantage, increase, decrease, to install, to haul, axle boxes, to introduce, first, cold, disadvantage, to start, low, to change, device, to lubricate, lubrication.

Grammar: 1. Inversion.
2. Conditional sentences with the verb “Should”.

Exercises
I. State the part of speech of the words and translate them:
To overheat, overheat, overheating; traction, tractive; to haul, haulage, hauled, hauling; to equip, equipped, equipment; to accept, accepted, acception, accepting; universal, universally; to roll, roller, rolling; to develop, developed, development; to reduce, reduction, reduced; to install, installation, installed.

II. Arrange the following in pairs of synonyms:
1. device a. to install
2. form b. possibility
3. disadvantage c. to attain
4. to use d. to get
5. to recognize e. draw back
6. the same f. to accept
7. capability g. to stay
8. to remain h. to obtain
9. to achieve i. similar
10. to receive j. to apply
11. to desire k. to wish
12. to reduce l. installation
13. to place m. to decrease

III. Arrange the following in pairs of antonyms:
1. separate a. ferrous
2. commonly b. bad
3. simply c. to disconnect
4. non-ferrous d. unusually
IV. What are the functions of “ed”?
Are being replaced, have been used, is greatly affected, are equipped, have been introduced, were accepted, overheated bearings, the experience gained showed that…, could be attained, are lubricated, thermometer installed, if overheated, have developed, had been introduced, had equipped, was being applied, is being used, were being installed, being showed, having been introduced, having equipped.

V. a) Mind the difference between the words:
Bread - broad
Bus - busy
Could – cold - call
Center - century
Early - yearly
Engine – engineer- engineering
Feature - future
For – but for
Have - heavy
Hard - hardly
Hole - whole
Late -lately
Less – least – at least
Main - many
Mode - made
Most - must
Near - nearly
Number – a number – the number of
Now-new
Often-after
People - pupil
To present – to present smb with smth. – present – at present
Physicist -physician
To provide - provided
Resource - research
Science - since
Some – the same
Specialist - speciality
Specially - especially
Star - stair
Thanks a lot – thanks to
Though – through - throughout
One - own
Only – the only
Very – the very
To wait - weight
To work – to walk
Why - who
Well – as well – as well as
Word - world
To present – to present smb with smth. – present – at present
VI. Give English equivalents to the underlined words and expressions:

The advantages of roller bearings, the disadvantages of solid bearings, to reduce bearing wear, to place roller bearing in the freight car journal boxes, to recognize a method universally, a recognized method, to obtain satisfactory results, to achieve a high speed, to cause much wear, to become too hot, an overheated axle box, the effort developed by a locomotive in hauling trains, the electric motors driving the wheels, to inform the trainmen of a hot box.

VII. Translate into English:
Трение между подшипником скольжения и шейкой оси, преимущества подшипников качения, возможности подшипников качения, тенденция к перегреву, предупреждать о горячей буксе, добиться значительного уменьшения износа подшипников, признать метод повсеместно, общепринятый метод, приобретать опыт, приобретенный опыт, добиться (получить) хороших результатов, достигать высоких скоростей, увеличить тяговое усилие, установить подшипники в тяговых двигателях, вызывать трение, вместо звукового сигнала, худший недостаток, слишком сильно перегреваться, подверженный влиянию температуры, загустевать в холодную погоду.

VIII. 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.

b) Find in the text similar sentences.

IX. Read and translate the text. Answer the questions:
1. What are the drawbacks of solid bearings?
2. Why does it take much tractive effort to start and to haul a train with solid bearings in cold weather?
3. When and where were roller bearings first introduced?
4. Why were roller bearings universally accepted only after 1920?
5. What advantages could be attained thanks to the application of roller bearings?
6. Under what conditions can roller bearings run for a long time?
7. Are roller bearings often relubricated?
8. Does the friction of roller bearings depend a great deal on temperature change?
9. How can trainmen know that their car develops a hot box?

X. Write out drawbacks of solid bearings.

XI. Translate the text with the dictionary (20 min):

The aim of the hot box detector is to detect overheated journals before they can cause serious damage. Hot box detectors are sited along the line and have digital display boards (табло) which provide a visual report for train crews when the detector spots an overheated journal. The operation is as follows:

- When a train approaches the hot box detector, the driver informs the rear end crew about it. The rear end crew will observe the digital display and the warning lights that tell which side of the train has the hot box. The signals will remain lighted for 90 seconds after the last car passes the detector.
- If no hot box has been detected the display reads "000". Should the detector be actuated by an overheated journal, the warning lights will start flashing and the display will indicate the number of the hot box.

XII. Render in English:

Машины, которые не требуют смазки

Научно-исследовательский институт предлагал использовать антифрикционные самосмазывающиеся пластмассы для изготовления деталей машин. Такие машины могут работать в экстремальных температурных условиях, в космосе (в вакууме) и в присутствии (presence) активных химических веществ, когда обычные (conventional) смазки бесполезны (to be of no use). Подшипники качения, зубчатые (gear) колеса и другие узлы (assemblies) и детали из антифрикционных материалов служат (serve) в 3-10 раз (times) дольше даже в самых трудных условиях. Сами же машины имеют меньший вес.

Смазка на основе из металлов

Гомелевский университет предложил добавлять порошкообразный (powered) металл в смазку, используемую в подшипниках качения для того, чтобы продлить (to increase) срок службы (a life) этих фрикционных устройств. Для этой цели необходимы сверхпластичные металлы.

При погружении в смазку в порошкообразной форме сверхпластичные металлы или сплавы (alloys) образуют (form) очень маленькие (tiny) шарики, которые уменьшают коэффициент (coefficient)
XIII. 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.
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.

Lesson 11

Automatic coupling

Each car in a train must have strength to take and transmit the pull of the locomotive. It must have couplings to link it with its follow cars, draft gear for absorbing strains and stresses between cars, and breaks for separate control. The screw couplings are sure to have been crude devices, and the process of linking cars was inconvenient and dangerous. It required a brakeman to stand between the cars to couple and uncouple them. At present automatic couplings are universally accepted. In this system two vehicles, on being brought together, couple themselves automatically provided the couplings are set in the right position to engage each other.

Automatic couplings possess many benefits. They reduce considerably risk of injuring to the brakeman and save a great deal of time in sorting trains. Moreover, they have a bearing strength three or four times greater than that of the screw coupling and, therefore make it possible to considerably increase the weight of trains. Car couplers are not fastened rigidly to the car underframe. If they were, the shock of starting and stopping a train would cause the couplers to break and the cars to be badly damaged. The couplers must have “give” or “play” in them, this being furnished by a draft gear.

When a train starts the couplers move out a little from the car. They look as if they were stretching. This means that the pull of the locomotive is applied gradually to the body of the car; the give of the draft gear absorbing most of the shocks, protecting cars and couplers from being damaged.

Notes:

1). Bearing strength

2). “Give” or “play”
Words to be remembered

1. Pull  
tяговое усилие, тянуть
2. Couple  
сцеплять; пара
  Coupler  
сцепное устройство
  Coupling  
сцепка; муфта
  Screw coupling  
винтовая сцепка (стяжка)
3. Draft gear  
amortизирующее устройство;  
поглощающий аппарат
4. Strain  
усилие, напряжение
5. Brake  
тормоз
  Brakeman  
tормозной кондуктор
6. To engage  
зацеплять, сцеплять
7. To set in position  
устанавливать в нужное  
положение
8. Link  
связывать; связь, звено
9. To absorb shocks  
pоглощать удары (толчки)
10. Evident = obvious  
ochевидный
11. Separate  
отделять; отдельный
12. Provided  
при условии, что
13. To injure  
повреждать, наносить увечье
14. Damage  
повреждение; повреждать
15. To furnish = provide =  
supply = fit = equip  
оснащать
16. To protect  
защитить
17. Flash  
вспышка, сверкание
18. Buzzer  
гудок, сирена

Words to be reviewed
Transmit, transmission, device, convenient, inconvenient, universally, accept,  
accident, position, benefit, possible, considerably, weight of a train, fasten  
rigidly, car underframe, most, protect, reduce (decrease), a great deal of time,  
increase, tractive effort.

Grammar: 1. Conditional Sentences (revision)

Exercises
I. Define the part of speech of the following words:
Transmit, transmission, transmitted; danger, dangerous; require, requirement,  
required; automatic, automation, automatically; consider, considerable,  
considerably; damage, damaged; apply, application, applied; protect, protecting;  
mean, means, meaning; gradual, gradually; move, movement, moved; evident,  
evidence.
II. Revise negative suffixes and prefixes of an adjective:
    less-hopeless
    im-impossible
    in-incorrect
    ir-irregular
    un-uncommon

III. a) Define Tense and Voice of the verbs:
1. It required a brakeman to stand between the cars to couple and uncouple them.
2. Automatic couplings are universally accepted.
3. Automatic couplings possess many benefits.
4. Such couplings were the cause of many accidents.
5. Car couplers are not fastened rigidly to the car underframe.
   b) Make up questions to the subject.

IV. Give Russian equivalents:
To take and transmit the pull of the locomotive, to link it with its follow cars, brakes for separate control, to couple and uncouple the cars, the cause of many accidents, couple themselves automatically, three or four times greater than, to considerably increase the weight of trains, to shock of starting and stopping a train, to move out a little from the car, as if they were stretching, protect cars and couplers from being damaged.

V. a) Complete the following sentences:
1. ...for separate control.
2. ...the weight of trains.
3. ...to engage each other.
4. ...to the body of the car.
5. ...the pull of the locomotive.
   b) 
1. ...to stand between... .
2. ...to link it with... .
3. ...couples themselves... .
4. ...look as if... .
5. ...the couplers to break... .
6. ...protecting cars... .

VI. Express in one word:
1) device installed on locomotives, carriages, motor cars to make the speed slower or to stop movement;
2) mechanical device used to link two railway cars or a locomotive with its follow car;
3) a kind of car which presented some difficulties in linking cars and was rather dangerous for brakemen to operate it;
4) the forces which arise between cars when the train stops or starts or changes its speed;
5) a device which absorbs strains and stresses between cars;
6) the part of a motor car or a locomotive which transmits power from the engine to the axles.

VII. Correct these wrong statements:
1. Screw couplings didn’t cause accidents.
2. Draft gear links a locomotive with its follow cars.
3. At present two vehicles are coupled with the help of brakesmen.
4. Couplers protect cars from being damaged.
5. Automatic coupling is worse than screw coupling.
6. If car couplers were fastened rigidly to the car underframe the cars would not be damaged.

VIII. Remember the meaning of the underlined words:
1. The idea of container traffic is as old as the railways themselves.
2. In container service the consignors (грузоотправители) load their goods into containers themselves.
3. Modern couplers may be referred to the so-called self-acting appliances.
4. Although the suggested idea seems promising, the design itself can’t be considered acceptable.
5. The main advantage of spherical roller bearings is their self-aligning property.
6. The designer decided to test his device himself.
7. The diesel engine is also known as a self-ignition engine.
8. We want to apply this invention by ourselves.

IX. Find one sentence with Complex Subject. Translate it.

X. a) You know three types of conditional sentences. Define the type and translate the sentences:
1. Railroad cars can stay on the tracks if their trucks or bodies are flexible enough to adjust to changing rail conditions.
2. If the side frames could not move to some extent in relation to each other, the trucks would lack flexibility.
3. The sorting of trains and separate cars would have taken more time unless the automatic couplings had been devised.
4. Were aluminium alloys used to manufacture car carrier structures, the latter would not be strong enough.
5. But for the draft gear the couplers would have been frequently damaged.
6. The construction cost of carriages and wagons will be quickly repaid provided their seating and carrying capacity are large enough.
7. If strong alloy steels had not been made, the railway vehicles could not have lasted long.
8. But for the introduction of roller bearings the high-speed railway vehicles would have frequently developed hot boxes and the bearing wear could not have been reduced.
9. The modern rolling stock could not have been repaired so quickly unless many of its assemblies (узлы) and parts had been unified.
10. Had the passenger car trucks not been furnished with various shock absorbing devices, the passengers would have suffered from shocks transmitted by the wheels from the tracks.

Notes:
if = если
unless = если не
in case = в случае
provided = при условии, если
but for = если бы не
had we = если бы мы

b) You can easily find one more sentence in the text, can’t you?

XI. Render in English:
1. Contemporary rolling stock is equipped with a coupler. 2. The shock-absorbing device prevents damage to the coupling. 3. If the couplings are placed in the correct position, they engage automatically. 4. The brake line is connected between the cars using flexible rubber couplings. 5. The screw coupling has many disadvantages. 6. The shock-absorbing device absorbs the forces and stresses between the cars. 7. The coupler eliminates the danger of injury for brake conductors. 8. The driving force from the locomotive is transmitted gradually to the car body. 9. The cars are equipped with individual brakes. 10. The coupler is a convenient type of coupling device; its advantages are obvious.

XII. Read the text without a dictionary and answer the questions:
1. What is the function of couplings?
2. What absorbs strain and stresses between cars?

XIII. Reproduce the dialogue:
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?

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

Mark Diamond
4701 Pine Street, # K-13
Philadelphia, PA 19143
Tel. 1- (215) – 748 – 3037
April 2, 2005

Dear Mr. Marinichenko:

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 Ukrainian 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 2006.

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 – 30 37. 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
XV. To find a good job one has to write a resume. Here is an example of such a resume:

Resume

John H. Mill  
38 Park Avenue, Ap. 50  
New York, N.Y. 11298  
Tel. (312) 493 -8332

OBJECTIVE A position as a bookkeeper.
SUMMARY 12 years of experience in every routine work in this field. Perfect knowledge of computers and statistics.
QUALIFICATIONS Make up all kinds of financial reports, balances and production planning.
EXPERIENCE FRISCO DOCKS, Inc.  
San Francisco, California.  
Deputy Chief of Planning, Commerce Dpt.  
On charge of account books, statements, new ideas in planning.
1980-1990 SAKHA Co, LTD.  
NEW York.  
Accountant. Prepared accounts and balance sheets of every kind.
EDUCATION LONDON SCHOOL OF ECONOMICS  
London, Great Britain, Bachelor (Ec.)
REFERENCES Available upon request.

XVI. Remember DOs and DON’Ts for job Seekers

<table>
<thead>
<tr>
<th>DO</th>
<th>DON’Ts</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO learn ahead of time about the company and its product. Do your homework.</td>
<td>Предварительно получите информацию о фирме и ее специализации. Это будет Ваше домашнее задание.</td>
</tr>
<tr>
<td>Do apply for a job in person</td>
<td>Обращайтесь за работой лично.</td>
</tr>
<tr>
<td>Do stress your qualification for the job opening.</td>
<td>Подчеркните, что Вы имеете квалификацию, необходимую для данной работы.</td>
</tr>
<tr>
<td>Do assume an air of confidence.</td>
<td>Предполагайте атмосферу доверия.</td>
</tr>
<tr>
<td>Do approach the employer with respectful dignity.</td>
<td>Приближайтесь к работодателю с уважительным достоинством.</td>
</tr>
<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>
</tbody>
</table>

64
<table>
<thead>
<tr>
<th>English</th>
<th>Russian</th>
</tr>
</thead>
<tbody>
<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>Подчеркивайте 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, take physical examination or tests request.</td>
<td>НЕ колеблясь, заполняйте анкеты, предоставляйте отзывы, выполняйте физические и другие тесты по просьбе работодателя.</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 приниженности.</td>
</tr>
</tbody>
</table>
Грамматический тест

I. Предложению соответствует следующий перевод:

1. The locomotive is being repaired.
   a) отремонтирован
   b) ремонтируют
   c) ремонтировали

2. The locomotive has been repaired.
   a) ремонтируют
   b) ремонтировали
   c) отремонтировали

3. This locomotives works was built.
   a) эти локомотивные заводы были построены
   b) этот локомотивный завод был построен
   c) этот построенный локомотивный завод
   d) эти построенные локомотивные заводы

4. The traffic carried on the line …
   a) перевозки осуществлялись на линии
   b) перевозки, осуществляемые на линии
   c) осуществляемые на линии перевозки

5. The development introduced.
   a) усовершенствования внедряются
   b) внедрённые усовершенствования
   c) усовершенствования внедрили
   d) усовершенствование внедрили

II. Сказуемое в предложении отвечает на вопрос:

  1. Что было сделано?
     a) Calculations have shown a sharp increase in car production.
     b) It has been estimated that automobile burns about 2 tons of fuel per year.
     c) For many years the system described was being used on steam railroads quite successfully.
     d) The drivers cab was provided with air conditioning.

  2. Что делается?
     a) This locomotive is designed to speed up the sorting operations.
     b) Automatic train control is being introduced on electrified railways.
     c) Conditions have been provided to complete the experiment in time.

  3. Что будет сделано?
     a) This fact should be mentioned at the conference.
     b) The monorail railroads will be built to link cities with their airports.
c) Computers perform calculations quickly and efficiently.
d) Modern TV sets are filled with different electronic devices.

III. Глагол "to be" выражает "долженствование" в предложении
a) Battery electric cars are practically noiseless in operation.
b) The real solution is to bring freight trains up to passenger standards.
c) Goods were to be loaded in containers.
d) The alternative is to have one route for passenger trains and another for freight trains.
e) Today, signalling, brakes and track are all being improved.
f) Train control is achieved through line-side cables.
g) The designers are working to improve metro escalators.

IV. 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.

V. 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
   c) 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
b) am      e) were
c) does    f) did
g) have

VI. Установите правильную последовательность порядка слов:

в утвердительном предложении в вопросительном предложении
to remain to
means is
vital be
of what
communication of
have the role
the railway in
to increase railways
will the future
speed its

VII. Причастие II 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.

VIII. 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 много дел.

   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.

**IX. Причастный оборот содержится в предложении:**

a) Having been shown the picture we expressed our opinion.  
b) When showing him my poems I always want to know his opinion.  
c) Having shown my poem to the professor, I was eager to listen to his opinion.  
d) The article having been discussed, we decided to publish it.

**X. Причастие первое вы употребили бы в предложении:**

a) (to attend) art exhibitions we improve and develop our artistic taste.  
b) (to attend) the exhibition we decided to arrange a discussion.  
c) The meeting (to attend) by many people.  
d) The exhibition (to attend) we organized a discussion.

**XI. Сложное дополнение употребляется в следующих предложениях:**

a) She wanted to be introduced to me.  
b) She wanted him to be introduced to her.  
c) We expect everybody to be ready at seven.  
d) He is considered to be a good designer.  
e) I knew him to be a clever man.  
f) She was the last to come.  
g) It is important for them to read this article.  
h) Our teacher is heard by everybody.

**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.

No 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.
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>
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<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, уезжать</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>
</tr>
<tr>
<td>Бежать</td>
<td>run</td>
<td>ran</td>
<td>run</td>
</tr>
<tr>
<td>Видеть</td>
<td>see</td>
<td>saw</td>
<td>seen</td>
</tr>
<tr>
<td>Посылать</td>
<td>send</td>
<td>sent</td>
<td>sent</td>
</tr>
<tr>
<td>Показывать</td>
<td>show</td>
<td>showed</td>
<td>shown</td>
</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, изнашивать (с я)</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>
Complex Subject
(сложное подлежащее)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Подлежащее в общем падеже или местоимение</td>
<td>Сказуемое в пассивном (или активном) залоге</td>
<td>Инфинитив</td>
<td>Второстепенные члены предложения</td>
</tr>
<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>

Complex Object
(сложное дополнение)

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 местоимение в объектном падеже</th>
<th>+</th>
<th>Инфинитив</th>
</tr>
</thead>
<tbody>
<tr>
<td>We consider him to be our greatest scientist.</td>
<td>Мы считаем его нашим величайшим ученым.</td>
<td></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>
<td></td>
</tr>
<tr>
<td>We know the rail joint to be the weakest place of the track.</td>
<td>Мы знаем, что рельсовый стык является самым слабым местом пути.</td>
<td></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. |
Additional reading

My country, Russia

My country, the Russian Federation, is the largest state in the world. Its territory is over 17 million square kilometers, the population being more than 150 million. 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.

Within a historically short period my country has achieved great success in all spheres of industry, technology, science, democracy and cultural life. All forms of property (of means of production) are regarded as equal. The country's economy is being transformed into a free market model.

Nowadays Russia remains a powerful state enjoying a high reputation among other nations of the world. It plays an important part in the Commonwealth of Independent States (CIS). It is a peace-loving country and a member of the United Nations Security Council.

Lake Baikal

For Russian people Lake Baikal is a natural treasure. It is located in the south of Eastern Siberia in the Buryat Autonomous Republic and the region of Irkutsk. Baikal is the deepest lake in the world. Its average depth is 730 m, and maximum depth in the middle – 1620 m. 336 rivers and streams flow into Lake Baikal and only one, the Angara flows out from it. Compared with the other great lakes of the world the Baikal is enormous. It holds 20 percent of the earth’s fresh water. It would take all the rivers of the world nearly a year to fill Lake Baikal’s basin.

The wildlife of the Baikal is rich and diverse. Its waters hold over 1200 species of animals and 50 species of fish including famous omul, grayling and lake sig. The largest fish in the lake is the sturgeon that is sometimes 180 sm long and weighs up to 100-120 kg. Baikal is home to the world’s only fresh water seal. One of Baikal’s mysteries is how these seals penetrated to the fresh water of Baikal.
Besides being exceptionally rich with aquatic life, Baikal’s water is very clear and almost distilled. One of the reasons for its water’s purity is that there is a minute crayfish which catches the smallest water-plants and bacteria.

In the taiga around Baikal you can see bear, deer, elk, but the pride of the forests is the Barguzin sable.

Your first visit to Lake Baikal leaves you with an impression of might, purity and grandeur. You begin to realize why local people speak reverently of the lake, as of a living creature and call it a sea instead of a lake. It’s the deepest, cleanest and, with regards to its unique rich wildlife, rarest lake-sea in the world.

**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 signalling 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.

The programme for structural reform in the railway industry includes three stages:

- First stage (2001-2002) - development of a competitive sector in rail transportation industry.
- Growth of competition in rail transportation will increase service quality, enlarge the range of services raise the efficiency of railways and availability of services.
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.

The United States of America

After its 200th birthday the United States of America still holds the leading position in the western world. A country that inspired many appellations — "Land of Opportunity," "Melting Pot," "God’s Country," is still referred to us as a land of superlatives — "the richest," "the greatest," "the most."

What makes the USA the leader of the western world is its economic, political and military dominance over other countries?

The United States lies in the central part of the North American Continent between the two oceans: the Atlantic Ocean to the East and the Pacific Ocean to the West. Friendly Canada to the north and friendly Mexico to the south are the only countries bordering it.

The USA consists of three separate parts. They are the Hawaiian Islands, situated in the central part of the Pacific Ocean, Alaska; separated by the Canadian territory and the rest major part of the USA. The states differ very much in size, population and economic development.

There are many big cities and towns in the USA: New York, San Francisco, Washington, Chicago, Los Angeles are the biggest of them.

The United States of America is a parliamentary republic. The government is divided into three branches: legislative (the US Congress), executive (the President and his Administration) and judicial (the US Supreme Court).

There are two main political parties in the USA: the Democratic (symbolized by a "donkey") and the Republican (its symbol is an "elephant"). The US President is both head of state and government. He is elected for a four-year term. Presidential elections are held every leap year on first Tuesday after first Monday in November. The President is assisted by Secretaries who are the heads of the executive departments. The Supreme Court consists of Chief Justice and eight Associate Justices who are appointed for life. It is supposed to decide
whether a law of the Congress or an executive order of the President is constitutional or not.

The form of US government is based on the Constitution of September 17, 1787, adopted after the War of Independence. In December 1791, the Congress adopted ten amendments to the Constitution, known as the Bill of Rights. The latter enumerated what the government controlled by the oligarchy was not going to be allowed to do, which was, of course, an important democratic gain for people.

The Congress of the United States is composed of two houses, the Senate and the House of Representatives. The Senate represents the states and the House represents the population according to its distribution among the states. All states have electoral requirements of the same nature. First of all they are residence requirements.

Through its power over the purse, the US Congress can control much that relates to foreign policy, also it is a governmental body that determines taxation.

Each of the fifty states of the USA has a constitution patterned after the federal Constitution, with its divisions of power: legislative, executive, and judicial.

The Presidency means not only a man: means an institution — the "executive branch" of the government.

The Supreme Court is the highest court in the country and the head of the judicial branch of US government. The federal and state courts have the power of "judicial review." Also there are about ninety district courts in different parts of the United States. American judicial practice is firmly committed to the idea of jury trials. The constitution guarantees them for both criminal and civil cases. According to the US judicial doctrine, “justice is a relationship in which each citizen or group receives due respect and return.

**Canada**

Canada consists of almost all of the North American continent north of the US except Alaska. Its total land area of more than 91 sq. km makes it the second largest country in the world.

Canada's topography is dominated by the Canadian Shield, an ice-scoured area covering half the country. Most of northern Canada has sub arctic or arctic climates, with long cold winters lasting 8 to 11 month, short sunny summers, and little precipitation. In contrast, the populated south has a variety of climatological landscapes.

The total population according to the census of 1981 was about 241 mln people with the average population density of 2.8 per sq. km.

English and French are the official languages of Canada and have equal status and equal rights and privileges as to their use in all governmental institutions.
Canada is a federation of 10 provinces and 2 northern territories. The federal Parliament is made up of the House of Commons and the Senate. The leader of the party that wins the largest number of seats in a newly elected House of Commons is asked to form the government.

The civil law follows English common law everywhere except in Quebec, where it follows the Napoleonic Code.

Canada is a world leader in the production of asbestos, nickel and other elements, forestry products, and ranks first in the world of minerals. Although no longer the foremost sector of the economy, agriculture is of major importance to the economy as a whole and still is basic in many areas. Canada is among the world's leading wheat producers and is the second in the export of wheat. Basically, Canada has a free-enterprise economy. A recurrent problem for Canada has been the dominant position of US corporations and investors.

**Australia**

Australia is lying south-east of Asia, between the Pacific and Indian oceans. It is the world's smallest continent which is almost completely surrounded by ocean expanses. Its total area is 7,682,300 sq. km.

The continent of Australia is divided into four general top regions: a low, sandy eastern coastal plain, the eastern highlands, the central plain, and the western plateau. Although Australia has diversity of climatic conditions, the climate of Australia is generally warm and dry, with no extreme cold and little frost. It changes from comfortably mild in the south to hot in the central inferior and north.

The total population in 1986 was about 16 mln people with average population density of about 2 persons per sq. km. Australians are of British or Irish ancestry. More than 99% of population speaks English.

The capital of Australia is Canberra. Australia has a federal parliamentary government. The Australian federation was formed on January 1, 1901, from six former British colonies, which thereupon became states. The Australian constitution combines the traditions of British parliamentary monarchy with important elements of the US federal system. Powers of the federal government are enumerated and limited. The government consists of the British sovereign and the Australian Parliament.

Australia is the world's largest wool producer and one of the world’s largest wheat exporters. The main sources of foreign earnings are wool, food and minerals which also provide raw materials for home processing industry.

**New Zealand**

New Zealand is situated in the southwest Pacific Ocean on two large islands: the North Island and the South Island. Its total area is 268,112 sq. km.
Less than 1/4 of the territory of the country lies below the contour line. The South Island is significantly more mountainous than the North Island. New Zealand has a temperate, moist climate without marked seasonal variations in temperature or rainfall.

The total population in 1986 was about 3.3 mln people with the average population density of about 12 persons per sq. km. About 85 % of the population is classified as Europeans. Most of them are of British descend. English is the universal language.

The capital of New Zealand is Wellington. Like the United Kingdom New Zealand is a constitutional monarchy. Officially the head of the state is the British Queen (or the King) whose representative, the governor-general, is appointed for a five-year term. The government of New Zealand is democratic and modeled on that of the United Kingdom.

The economy of New Zealand has traditionally been based on pastoral farming. The last decades have seen a large expansion in the light industries. New Zealand draws many thousands of tourists to its shores because of the beauty, diversity, and compactness of its natural attractions.
Vocabulary

A
accelerate, v
accident, n
accuracy, n
adhere, v
adjust, v
adopt, v
advantage, n
amplifier, n
apparatus, n
assembly, n
assist, v
atom-power engine
average, a
automation, n
auxiliary, a

B
battery, n
storage battery
beam, n
body, n
bottom, n
brake, n
braking device
dynamic braking
bulk

carriage, n
carry, v

C
cable, n
capacitor, n
capacity, n
carrying capacity
car, n
- box car
- gondola car
- flat car = platform car
- hopper car
- refrigerator car
- tank car
carriage, n
carry, v

ускорять
авария
точность
сцепляться
регулировать
принимать
преимущество
усилитель
прибор, инструмент
узел, комплект, агрегат
помогать
атомный реактор
средний
автоматизация
вспомогательный
батарея
аккумуляторная батарея
балка
кабель
кабель
конденсатор
производительность, мощность,
способность; провозная
способность
вагон
крытый грузовой вагон
полувагон
вагон-платформа
вагон-хоппер
рефрижератор
вагон-цистерна
пассажирский вагон
перевозить
charge
coach, n
comfort, n
compartment, n
conductor, n
semiconductor
conductivity, n
congestion, n
converter, n
counter, n
coil, n
coefficient, n
clay
circuit, n
short circuit
change over, n
cheap, a
coach, n
connect, v (in series)
construct, v
consumer, n
consumption, n
contact wire, n
faulty contacts
contents, n
control, v
control (system)
remote control
convenient, adj.
conventional, adj.
conversion, n
convert, v
cost, n
initial cost
crankshaft
crew
crossing, n
current, n
- alternative current
- current input
- direct current
- field current
curve
**D**
damage, n  ущерб
dangerous, a  опасный
decrease, v  уменьшать
density, n  плотность
design, v  конструировать
detect, v  обнаруживать
development, n  развитие
deviation, n  отклонение
device, n  устройство, прибор
disadvantage, n  недостаток
distribute, v  распределять
distribution, n  распределение
downgrade, n  уклон
draw gear  тяговое устройство
drawback, n  недостаток
drive, v (a locomotive)  управлять (локомотивом)
driver, n  машинист
driving cab  кабина машиниста
drop, n  понижение
duplex operation  дуплексная работа связи

**E**
efficiency, n  эффективность, КПД
efficient, a  эффективный
effort, n  усилие
treactive effort  тяговое усилие
electric, a  электрический
electricity, n  электричество
electrify, v  электрифицировать
electrified, a  электрифицированный
electricity grid  электрическая система
electromotive force  электродвигущая сила
emergency, n  авария
ergy, n  энергия
eengine, n  машина, двигатель; локомотив
- fire engine  пожарная машина
- internal combustion engine  двигатель внутреннего сгорания
- start an engine  запускать двигатель
engineman, n  машинист
essential, a  основной
equip, v  оборудовать
equipment, n  оборудование
equipment, n  оборудование управления
<table>
<thead>
<tr>
<th>Word</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<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>feed (fed, fed)</td>
<td>питать</td>
</tr>
<tr>
<td>filter, n</td>
<td>фильтр, очиститель</td>
</tr>
<tr>
<td>fit, v</td>
<td>устанавливать, монтировать</td>
</tr>
<tr>
<td>to be fitted</td>
<td>быть снабженным</td>
</tr>
<tr>
<td>fittings, n</td>
<td>оборудование, арматура</td>
</tr>
<tr>
<td>fixed, a</td>
<td>неподвижный</td>
</tr>
<tr>
<td>freight, n</td>
<td>грузы</td>
</tr>
<tr>
<td>- freight turnover</td>
<td>грузооборот</td>
</tr>
<tr>
<td>frequency, n</td>
<td>частота</td>
</tr>
<tr>
<td>friction, n</td>
<td>трение</td>
</tr>
<tr>
<td>fuel, n</td>
<td>топливо</td>
</tr>
<tr>
<td>- fuel expenditure (expenses)</td>
<td>расход топлива</td>
</tr>
<tr>
<td>furnish, v</td>
<td>поставлять, снабжать, оборудовать</td>
</tr>
<tr>
<td>gap, n</td>
<td>зазор</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>
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- locomotive hauled train
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- power failure
- motive power
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- power set
- power source
- power supply system
powerful, a
- power plant
potential, n, a
pressure
primary, a

мотор, двигатель
однофазный двигатель
тяговый двигатель
устанавливать
двигатель
основной двигатель
необходимый
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цветные металлы
ядерный
управлять, работать, действовать
управление
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punctured card
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- third rail
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- run the service

перспективный
свойство
защищать
защита
тянуть, тащить
насос
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кнопка
рельс
ходовые рельсы
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дразина
железная дорога
железнодорожная техника
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реле
скорость
выпрямитель
восстанавливать
регулировать
реле, переключатель
ремонтировать; ремонт
капитальный ремонт
текущий ремонт
требование
сопротивляться, противостоять
сопротивление
ресурс
природные ресурсы
полоса отвода
подвижной состав
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вращаться
вращение
уменьшать
двигаться, управлять, вести
управлять локомотивом
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thyristor, n  тиристор
top, n  верх
torque, n  пусковой момент
track, n  железнодорожный путь
tractive effort  тяговое усилие
trailer, n  трейлер
train, n  поезд
- fast train  скорый поезд
- through train  прямой поезд
- mixed train  грузопассажирский поезд
- slow train  медленный поезд
- wreck train  аварийный поезд
traction, n  тяга
traffic, n  движение, перевозки
- carry the traffic  осуществлять перевозки
- volume of traffic  объем перевозок
transform, v  превращать, преобразовывать
transformer, n  трансформатор
transmission, n  передача
- transmission of power to trains  передача энергии поездам
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traveller, n  пассажир
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- passenger turnover  пассажирооборот
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U
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unit, n  единица, агрегат, блок, узел
unload, v  разгружать
V
valuable, a  ценный
value, n  величина
constant value  постоянная величина
van, n  багажные вагоны
vehicle, n [viikl]
air-cushioned vehicle

voltage, n

W
wagon, n
- open-top wagon
weight, n
wheel, n

Y
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frontier yard

transportное средство
транспортное средство на воздушной подушке
напряжение

грузовой вагон
полувагон
вес
колесо

сортировочный двор
пограничный передаточный путь

Abbreviations

a. c. (alternating current)
A. D. (Anno domine)
a. f. (as follows)
a.m.(above mentioned)
a.m. (ante meridiem)
Appx (appendix)
a/c (account)
amt (amount)
app (appendix)
asp (as soon as possible)

at (atomic)
av (average)
B. C. (before Christ)
b. h. p. (1. British Horse Power, 2. brake horse power)

B. R. (British Railways)
Cf (compare)
cm (centimetre)
Co (company)
c. to c. (center to center)
c/s (cycle per second)

Cur. (currency)
CV (curriculum vitae)
c (century)
c (cirka) лат.
d. c. (direct current)

dd (dated)
R&D (Research and Development)

P.S. (post scriptum) лат. приписка
ref (reference) ссылка
R.J. (road junction) стык дорог
R/R (railroad) железнодорога
R-w (railway) железнодорога
Rwy, Ry, rly на миль
p. mi (per mile) обороты в минуту
r. p. m. (revolution per minute) доллар
$ (dollar) квадратный
sq (square) квадратный дюйм
sq. in (square inch) тонна
T (ton) вольт
V (volt) а именно
viz (videlicet, лат.) наоборот
V.v. (vice versa, лат.) грузовой вагон
van (wagon) скорость
V (velocity) объем
V,v (volume) высокопоставленное лицо
VIP (very important person) вес гарантирован
w.g. (weight guaranteed) ватт-час
w.h. (watt hour) ярд (91.4 см)
y.d (yard) и
& (and)
Literature

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Казарина Ирина Николаевна
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