**МИНИСТЕРСТВО ОБРАЗОВАНИЯ САРАТОВСКОЙ ОБЛАСТИ**

Государственное автономное профессиональное образовательное

учреждение Саратовской области

**«Саратовский архитектурно-строительный колледж»**

«Утверждаю»

Зам. директора по учебной работе

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**Методическая разработка**

**«**Практикум **по учебной дисциплине «Иностранный язык в профессиональной деятельности(Английский язык) для студентов специальности 08.02.01 Строительство и эксплуатация зданий и сооружений»**

Саратов, 2020

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**ПОЯСНИТЕЛЬНАЯ ЗАПИСКА**

Настоящая методическая разработка **«**Практикумпо учебной дисциплине «Иностранный язык в профессиональной деятельности (Английский язык) для студентов специальности 08.02.01 Строительство и эксплуатация зданий и сооружений» предназначен для студентов 2 курса, обучающихся по профессии 08.02.01 Строительство и эксплуатация зданий и сооружений. Практикум составлен в соответствии с требованиями ФГОС среднего общего образования, примерной программы по иностранным языкам и рабочей программы по английскому языку.

Комплекс текстов и упражнений, представленный в практикуме, ориентирован на овладение специальными лексическими терминами на английском языке, и дает возможность познакомиться с профессиональными текстами, специальной лексикой.

Данное пособие поможет изучению иностранного языка на новом уровне.

Начиная работу с данным пособием, следует познакомиться с его структурой. Пособие состоит из разделов – специальных тем , в которых представлены лексические единицы. Главы выполнены в единой структуре и содержат основную лексику по определенной теме по специальности «Строительство и эксплуатация зданий», задания и упражнения предназначены для ознакомления, тренировки, закрепления и анализа изученной лексики.

В каждой главе даются текст, вопросы на понимание содержания прочитанного текста, тренировочные упражнения, способствующие запоминанию, повторению, использованию профессиональной лексики. Они позволят разнообразить и оптимизировать работу студентов, содержат новую, интересную и полезную информацию.

Данный практикум может использоваться для самостоятельной подготовки по дисциплине «Иностранный язык (Английский язык) в профессиональной деятельности», обучающихся по специальности 08.02.01 Строительство и эксплуатация зданий и сооружений.

**Раздел 1.Требования к профессии**

**№ 1 Переведите текст**

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| The building construction industry is a wide industry that encompasses many professionals. Most of the building defects like cracks on walls, inadequate and non-functional facilities, flooding and dampness, poor drainage, poor safety design, poor staircases and even collapse to mention a few could be avoided. This article analysis the different professionals, their roles and responsibilities in avoiding defects and more in building construction. Geotechnical Engineer  (Инженер-геотехник)  Geotechnical engineering is a discipline within civil engineering related to the performance of soil and rock mechanics, including their subsurface conditions, determination of the physical, mechanical, and chemical properties that will influence the project under consideration. Site investigations are needed to gain an understanding of the area in or on which the engineering will take place. Investigations can include the assessment of the risk to humans, property and the environment from natural hazards such as earthquake, landslide and sinkhole. After necessary evaluation, design of the earthworks is carried out, and subsequently supervision of the site, foundation, and construction is carried out. Land Surveyor  A land surveyor is the government authorized specialist who is licensed to determine boundaries, they determine the relative positions of places on or beneath the surface of the earth by measuring distances, directions and elevations. They are the first professionals to carry out physical work on the construction site. In the construction phase surveying commences with correct placement of footings, foundations, piers and other items of building construction are essential for a sound structure. The second essential role is establishing a level for the proposed construction and establishing a benchmark that would be used as reference point throughout the construction phase. This is mostly neglected in Nigeria and the cause of flooding in most buildings.  **Architect**  Architects are licensed professionals trained in the art and science of building design, develop the concepts for structures and turn those concepts into images and plans. Before constructing a building, an architect needs to draw a plan of the building. It is very wrong to commence construction without a standard building plan, as the project would lacks focus and direction. Architects create the overall aesthetic and look of buildings and other structures, but the design of a building involves far more than its appearance.  Structural Engineer  Structural engineering is a branch of Civil engineering which carries out strength calculations, loads, forces and their interactions and effects on proposed construction and prepare drawings of structures to ensure they are strong enough to avoid collapse when loaded. Structures can include buildings, bridges, retaining walls, in-ground structures, footings, frameworks and space frames, including those for motor vehicles, space vehicles, ships, aero planes and cranes. Quantity Surveyor  (estimator)  A Quantity Surveyor is a construction industry professional who specialises in estimating the value of construction works. . This may include new buildings, renovations or maintenance work, from early design costs to final figures. QS works on a wide variety of projects covering all aspects of construction such as civil, mining and infrastructure projects to determine the cost of such facilities. The Builder The Builder study the production information that is the drawings, schedules and specifications they analyze the build ability and maintainability of buildings. He writes on the construction method and program, assess the workmanship skill of artisan and suggest solution to technical problems Building Service Engineers  Building services engineers work closely with other construction professionals such as architects, structural engineers and quantity surveyors. They influence the architecture of a building and play a significant role on the sustainability and energy demand of your building. They design layouts and requirements for building services for residential or commercial developments which is one of the requirements for building approval  Artisans  These are the real workmen on site. They are mostly technicians that have acquired various skills either on the job or in various skill acquisition institutes. They have improved skill on- the -job. They work with the various professionals carrying out their duties based on instructions though imputing their skills. The Consultants  The construction consultant's role is to represent the owner and to lend practical expertise to the job. The construction consultant is simply the client representative that wants the owner to achieve what the owner has contracted for from the contractors. He is the value-for-money bargainer! Working on behalf of the owner, the consultant can identify and address potential construction problems in the design stages and, as an independent party, may be in the best position to suggest cost saving or time saving alternatives and to evaluate suggestions made by the other parties. The Building Contractor  The building contractor draws up a plan to carry out the construction project. This extends anywhere from hiring workers to developing a step-by-step timeline that the project will follow from start to finish. The BC is responsible for hiring, supervising, firing and payment of workers alongside obtaining materials for the project to precise specifications, mostly using the services of suppliers.  The BC must also do his/her research regarding relevant regulations and laws guiding the construction process, he has the responsibility of completing the project in a law abiding manner. He acquires all necessary licenses and permits from relevant entities so that the building project can begin. In Nigeria for example you need a building approval, you pay development levies to mention a few.  **№ 2 Ответьте на вопросы:** |
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The Duties and Responsibilities of a Building Contractor

What Is a Building Contractor?

What Are the General Responsibilities of a Building Contractor?

What Are the Specific Duties of a Building Contractor?

What Traits Make a Good Building Contractor?

**№3 Переведите текст**

**Мой колледж. Моя профессия. Профессия строитель**

I’d like to tell you about my future profession such as builder. I think that builder is one of the necessary professions. Every day someone builds something in the world. I want to become a bilder too fireman, builder, architect and others should be responsible and do their job conscientiously. But I understand that this profession is very demanding. Sometimes it can de very dangerous for life. Nevertheless bilder is honorary title. In my opinion not everyone can confirm that title. Only an honest conscientious and responsible person can work in this sphere of activity. So, to sum it up I want to say that people who choose such professions as fireman, builder, architect and others should be responsible and do their job conscientiously!

**№ 4 Переведите текст**

**Моя специальность**

Building construction is the process of adding structure to real property or construction of buildings. The vast majority of building construction jobs are small renovations, such as addition of a room, or renovation of a bathroom. Often, the owner of the property acts as laborer, paymaster, and design team for the entire project. However, all building construction projects include some elements in common – design, financial, estimating and legal considerations. Many projects of varying sizes reach undesirable end results, such as structural collapse, cost overruns, and/or litigation. For this reason, those with experience in the field make detailed plans and maintain careful oversight during the project to ensure a positive outcome.

  We build because we need shelter. We need shelter from sun, rain, wind, and snow. Not much that modern people do takes place outdoors. Our activities mostly take place indoors. For these activities we need air that warmer or cooler than air outdoors. We may also need less light by day and more light by night than is provided by nature.

  It is a well-known fact that modern people in many countries also need services.      Mode rn services must provide energy, water, communications, and dispose of waste. Sanitary accommodation is also necessary and very important. For sanitary accommodation people must ventilation. It is important to note that all services and accommodations are preplanned and located on a site plan. A site plan must be prepared and provided for every building and every construction.

    What are the branches modern civil construction has? Among the branches the main ones are housing construction, construction of industrial enterprises, construction of railroads, highways, subways, construction of bridges, dams, ports, canals, construction of different sporting facilities. Among them there are stadiums, aqua parks, swimming pools, sporting complexes, and others.

**№ 5 Ответьте на вопросы**

Why do people need shelter?

What king of services and accommodation do modern people need and use?

What branches of modern civil construction do you know?

Do you attend any sporting facilities? What sporting facilities do you attend? How often do you attend them? Do you attend them regularly?

Do you want to take part in modern civil construction?

What branches of modern civil construction are you interested in?

**№ 6 Вставьте подходящие слова.**

They stayed (в помещении) \_\_\_\_\_\_\_\_\_\_ (из-за) \_\_\_\_\_\_\_\_\_\_ the rainy weather.

 People build houses (так как) \_\_\_\_\_\_\_\_\_\_ they need (убежище) \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

People’s activity takes place both (в доме)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and  ( на улице)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Sanitary accommodation (избавление от отбросов) \_\_\_\_\_\_\_\_\_\_ are provided by modern services.

Accommodations are (планируются заранее)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and located on a site plan.

**Раздел 2. История развития строительства. Первые постройки.**

**№ 1 Переведите текст**

**Building construction in the prehistoric times**

Construction has always been a reflection of the technological and ethical values of a specific society and its values at any given moment of time. The first “shelters” built by humankind date back to before 12,000 BC. From the very beginning man was a hunter-gatherer so building types characteristics of this period are: tents, huts and stone structures. Construction was based on simple techniques using readily available materials.

**The Tent**

These were used to create tents. Wooden poles and /or animal bones were utilized to erect a framework over which packed clay, animal hides or leaves were draped. In its crude form, the tent was erected by driving a pole in the ground, and slinging animal hides over it. Stones took the place of the hides then.

**The Hut**

The huts in its simplest form were made from wooden branches, which were stuck into the ground in a circle, and their upper, softer ends were tied together at the top. Over this framework, either hide was used as a cover, or broad leaves were intertwined to form a covering Although all traces of the roofs have disappeared, there were most likely built of dry-laid stone forming domed roofs.

Composite building materials were also used. Clay and wood were often used for permanent dwellings. The walls were made of small saplings or reeds driven into the ground, and tied laterally with vegetable fibers. This was then plastered over with wet clay for rigidity and waterproofing. The roofs must have been made of crude thatch bundles or bundled reeds.

**Stone Structures**

Heavier timber buildings were also found. These buildings were restricted in size as the stone tools used by man at that time were not very effective in cutting large trees for timber. Using the post and lintel system, a central row of columns was used to support the ridge pole and similar rows of columns were used for the long walls. Rafters were run from the ridge pole to the wall beams.

**№ 2 Выберите правильные ответы**

1. What was man from the very beginning?

a) He was a builder. b) He was a hunter-gatherer. c) He was a sailor.

2. What materials did humankind use in the prehistoric times?

a) He used only wood. b) He used concrete and steel. c) He used readily available materials.

3. What materials did people start to use instead of hides?

a) People started to use stones. b) People started to use bricks. c) People started to use plywood.

4. Why were timber buildings restricted in size?

a) They were restricted in size as there were no tools at all.

b) They were restricted in size as man didn’t know how to erect high buildings.

c) They were restricted in size as the stone tools were not very effective in cutting large trees for timber.

**№3 Дайте ответы на вопросы**

1. What is construction?

2. What were the first types of buildings people lived in?

3. How did humankind get bones and hides?

4. How did prehistoric man use bones and hides?

5. How were tents erected?

6. What is a hut and how did man make it?

7. What material did people use for rigidity and waterproofing of their shelters?

8. What form did the first roof have?

9. What did man utilize to roof the structure (the tent, the hut, the stone structures, the communal house)?

10.What were the walls of the communal house in filled with?

11. Why did people begin to build houses?

**№4 Составьте рассказ по опорным вопросам**

1. Construction of the tents: to hunt, hides and bones, wooden poles, to use, to erect a framework, to drive a pole, to throw on animal hides.

2. Construction of the huts: branches, to stick, in a circle, to tie the upper ends, framework, to form a covering, the Middle East, round dwellings, packed

clay, domed roofs.

3. Construction of the stone structures: stones, to be placed vertically, to be spanned across, dolmens, granaries and temples, Stonehenge, to be a puzzle, to be based on the post and lintel method.

4. Construction of the communal houses: heavier timber buildings, to be restricted in size, tools, to be not effective, a row of columns, to support, the ridge pole, rafters, to be run, the wall beams, to tie, vegetable fibers, thatch, to roof, to be unfilled with.

**№ 5 Переведите на английский язык**

to find / take a shelter; a bamboo hut; to have smb.’s hide; to intertwine all these aspects;

a private dwelling; a packed sand; a dry-laid stone wall; domed mountains; made of small saplings; a crude thatch; a bundle of nerves; to span a river with a bridge; a concrete pole, the ridge pole; to restrict certain information; to rafter; to bury the columns into the ground; to lay out the reed on the top; to daub; a tree bark; to be responsive to smth.

**№ 6 Соотнесите слова**

dwelling a) a place giving temporary protection from bad weather

responsive b) to connect or link (two or more things) closely

shelter c) to put a limit on

dome d) the skin of an animal

to intertwine e) reacting quickly

reed f) a small building of simple construction, shelter

to restrict g) a house

pole h) a rounded vault forming the roof of a building

hide i) a tall plant of the grass family that grows in water

hut j) a long, slender, rounded piece of wood or metal

**№7 Составьте предложения**

1. The first buildings were simple (шалаши, палатки, кровы) meant to suit the basic needs of protection from the elements, built by their inhabitants.

2. Cultures from pre-history to modern times constructed (куполообразное жилье) using local materials: leaves, shingles, wood, stones, reed, thatch and bricks later.

3. Wigwams are formed with a frame of (выгнутые шесты), most of-

ten wooden, which are covered with some sort of roofing material.

4. To build a wigwam, long fresh poles of oak or willow are driven into

the ground or (закапывать) in holes made with a digging stick.

5. These poles, which form the framework, are arranged at (интервал в один фут) and are bound together at the top with yucca-leaf strands.

6. The ancient builders (закапывать) the bones of deer and oxen at the bottom of the ditch and had looked after them for some time.

7. (Мазанка) is a form of wall construction consisting of interwoven twigs plastered with a mixture of clay, lime, water, and sometimes dung and chopped straw.

8. Rafter is a type of beam, which (поддерживать) the roof of a building. In home construction rafters are typically made of (дерева); they are a feature of traditional roof styles.

9. Katsuogi are short, decorative logs found on Japanese architecture, which are placed at a right angle along the (конёк крыши), and are usually featured in religious or imperial (архитектура).

10. It’s a good idea to (вырезать несколько лишних стропил); I’ve found that a couple of mine have bowed when I didn’t put them exactly straight the roof ring, and it’s nice to be able to replace them easily

**Раздел 3. Современные тенденции в развитии строительного производства.**

**№1 Переведите текст**

**New construction techniques and sustainability**

As efficiency codes have come into effect in recent years, new construction technologies and methods have emerged. University Construction Management departments are on the cutting edge of the newest methods of construction intended to improve efficiency, performance and reduce construction waste.

New techniques of building construction are being researched, made possible by advances in 3D printing technology. In a form of additive building construction, similar to the additive manufacturing techniques for manufactured parts, building printing is making it possible to flexibly construct small commercial buildings and private habitations in around 20 hours, with built-in plumbing and electrical facilities, in one continuous build, using large 3D printers. Working versions of 3D-printing building technology are already printing 2 metres (6 ft 7 in) of building material per hour as of January 2013, with the next-generation printers capable of 3.5 metres (11 ft) per hour, sufficient to complete a building in a week. Dutch architect Janjaap Ruijssenaars’s performative architecture 3D-printed building is scheduled to be built in 2014.In the current trend of sustainable construction, the recent movements of New Urbanism and New Classical Architecture promote a sustainable approach towards construction, that appreciates and develops smart growth, architectural tradition and classical design. This is in contrast to modernist and short-lived globally uniform architecture, as well as opposing solitary housing estates and suburban sprawl. Both trends started in the 1980s.

**№2 Расскажите основную идею текста**

**Flatiron building – skyscraper**

The “invention” of the skyscraper lies with George A. Fuller(1851 − 1900). George Fuller worked on solving the problems of the “load bearing capacities” of tall buildings. George Fuller built the Tacoma Building in 1889, the first structure ever built where the outside walls did not carrying the weight of the building. Using Bessemer steel beams, Fuller created steel cages that supported all the weight in tall buildings or skyscrapers. The Flatiron Building was one of New York City’s first skyscrapers, built in 1902 by Fuller’s building company. Daniel H. Burnham was the chief architect. It became known as the Flatiron Building because it was wedge-shaped like a clothing iron. Burnham gave the building this unusual shape to maximize use of the triangular lot. The Flatiron Building is only six feet wide at its tip. Offices at the narrow point offer spectacular views of the Empire State When it was constructed, some people worried that the Flatiron Building would collapse. They called it Burnham’s Folly. But the Flatiron Building was actually a feat of engineering that used newly developed construction methods. A sturdy steel skeleton allowed the Flatiron Building to achieve record-breaking height without the need for wide supporting walls at the foundation.

**Раздел 4. Перевод инструкций при работе на строительной площадке.**

**№ 1 Переведите инструкцию**

**Construction Site Safety Tips**

Duty to have fall protection is the most cited standard in the construction industry and is one of the leading causes of worker deaths in construction. Employers need to do a better job of assessing job sites and implementing fall protection systems to protect workers.

Workers: Workers should familiarize themselves with all potential fall hazards on a job site. Never work in an area where fall protection systems have yet to be installed. Workers using personal fall arrest systems should inspect them before each use to ensure they are working properly and are free of damage. The lanyard or lifeline should be short enough to prevent the worker from making contact a lower level in the event of a fall. This means taking into account the length of the lanyard, length of dynamic elongation due to elastic stretch and the height of the worker.

Employers: Employers are required to provide fall protection systems to protect their workers on walking or working surfaces with unprotected edges or sides that are six feet above a lower level. Fall protection can include guardrails, safety net systems and personal fall arrest systems. Guardrails are the only method approved that actually prevents falls from occurring. Safety nets and personal fall arrest systems prevent workers from falling a great distance.

**№2 Переведите инструкцию на английский язык**

Безопасность процесса эксплуатации машин и механизмов должна обеспечиваться использованием их в соответствии с проектами производства работ и технологическими картами.

1. Перед допуском к работе вновь привлекаемых работников необходимо провести инструктаж на рабочем месте. Все лица, находящиеся на строительной площадке, обязаны носить защитные каски. Работники должны обеспечиваться специальной одеждой.
2. Допуск посторонних лиц, а также работников в нетрезвом состоянии на территорию строительной площадки , в производственные, санитарно-бытовые помещения и на рабочие места запрещается.
3. Ограждение строительной площадки не должно иметь проемов, кроме ворот и калитки, контролируемых в течении рабочего времени и запираемых по его окончании контрольно-пропускным пунктом.
4. Входы в здание должны быть защищены сверху козырьком шириной не менее 2 метров от стены здания. Вход в здание со стороны подкрановых путей запрещен.
5. Проезды, проходы и рабочие места должны содержаться в чистоте и порядке, очищаться от мусора и снега, посыпаться песком и не загромождаться складируемыми материалами и конструкциями.
6. На каждом объекте строительства должны быть выделены помещения или места для размещения аптечек с медикаментами, носилок, фиксирующих шин и других средств для оказания первой помощи пострадавшим.
7. Ко всем зданиям, сооружениям и рабочим местам должен быть обеспечен свободный доступ. Проезды и подъезды к зданиям и пожарным водоисточникам.

**№3. Переведите текст**

The Health and Safety Executive (HSE) is a UK government agency responsible for the encouragement, regulation and enforcement of [workplace health, safety and welfare](https://en.wikipedia.org/wiki/Occupational_safety_and_health), and for research into occupational [risks](https://en.wikipedia.org/wiki/Risk) in [Great Britain](https://en.wikipedia.org/wiki/Great_Britain). It is a [non-departmental public body](https://en.wikipedia.org/wiki/Non-departmental_public_body) of the [United Kingdom](https://en.wikipedia.org/wiki/United_Kingdom) with its headquarters in [Bootle](https://en.wikipedia.org/wiki/Bootle), England. In [Northern Ireland](https://en.wikipedia.org/wiki/Northern_Ireland), these duties lie with the [Health and Safety Executive for Northern Ireland](https://en.wikipedia.org/wiki/Health_and_Safety_Executive_for_Northern_Ireland). The HSE was created by the [Health and Safety at Work etc. Act 1974](https://en.wikipedia.org/wiki/Health_and_Safety_at_Work_etc._Act_1974), and has since absorbed earlier regulatory bodies such as the Factory Inspectorate and the [Railway Inspectorate](https://en.wikipedia.org/wiki/Railway_Inspectorate) though the Railway Inspectorate was transferred to the [Office of Rail and Road](https://en.wikipedia.org/wiki/Office_of_Rail_and_Road) in April 2006. The HSE is sponsored by the [Department for Work and Pensions](https://en.wikipedia.org/wiki/Department_for_Work_and_Pensions). As part of its work, HSE investigates industrial accidents, small and large, including major incidents such as the explosion and fire at [Burchfield](https://en.wikipedia.org/wiki/2005_Hertfordshire_Oil_Storage_Terminal_fire) in 2005. Though it formerly reported to the [Health and Safety Commission](https://en.wikipedia.org/wiki/Health_and_Safety_Commission), on 1 April 2008, the two bodies merged

**№ 4 Переведите текст**

**Health & safety project**

Occupational Risk Prevention is nowadays considered to be a matter of high importance.

Following, the Spanish regulations regarding this issue are analyzed:

The basic character of Law 1/1995 on Occupational Risk Prevention does not only imply an absolute obligatory compliance as a Minimum Provision, but also of provisions of lower rank (Royal Decrees, Ministerial Orders, etc.). This law is mainly aimed towards permanent workplaces, making compulsory a study on potential hazards and the adoption of suitable preventive and corrective measures.

Due to their nature, construction sites are provisional workplaces, making compulsory the adoption of these measures, and if the labor inspection proves non-observance of regulations on occupational risk prevention, this would entail a serious and imminent risk to the safety and health of workers which may call for an immediate work stoppage.

It must be taken into account that, excepting exceptional cases commented in press releases, jurisprudence tends to admit the so-called objective liability. The worker has absolute protection against accidents and the contractor has a liability arising from the mere fact of developing an activity involving the possibility of accidents occurring, independently from the obligation to adopt all the necessary precautions. Then, the absence of prevention becomes an aggravating factor of liability, instead of being the determining factor.

In the case of construction works, the regulation is included in Royal Decree RD 1627/1997 of Minimum Provisions on this matter. The decree distinguishes between Basic Study and Health & Safety Study, and the predictions included are thereafter developed by the contractor in the Health & Safety Plan.

Each contractor shall elaborate a specific Occupational Health & Safety Plan for each work, in which the forecasts contained in the Study or Basic Study shall be analyzed, studied, developed and complemented, on the basis of its own system for executing the work.

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When applicable, this plan shall include proposed alternative prevention measures, which the contractor shall suggest with the corresponding technical justification and which may not involve a reduction in the protection levels provided for in the Study or Basic Study.

The Health & Safety Plan shall have to be approved, prior to commencement of works, by the Health & Safety Coordinator during the construction stage. In the case of Public Administration works, the plan, together with the corresponding report by the Health & Safety coordinator during the construction phase, will be submitted to approval by the project awarding public authority. When appointing a coordinator is not necessary, his functions will be assumed by the Construction Management.

**№ 5. Переведите слова**

1. Occupational Risk Prevention
2. The basic character of Law
3. high importance
4. absolute obligatory compliance
5. permanent workplaces
6. potential hazards
7. the adoption
8. suitable preventive and corrective measures
9. construction sites
10. the labor inspection
11. imminent risk
12. the safety and health of workers
13. exceptional cases
14. an immediate work stoppage
15. objective liability
16. the possibility of accidents occurring
17. the necessary precautions
18. the determining factor
19. an aggravating factor
20. Royal Decree
21. the contractor
22. elaborate
23. the forecast
24. to contain
25. to analyze
26. to study
27. to develop
28. to be complemented
29. the executing of work
30. applicable
31. alternative prevention measures
32. the corresponding technical justification
33. a reduction
34. protection level
35. to be approved
36. prior to commencement of works
37. the construction stage
38. report
39. the project awarding public authority
40. to be assumed
41. Construction Management

**Раздел 5. Строительные материалы, их свойства и функции.**

**№ 1 Переведите текст**

**Building material**

    Materials used for construction purposes possess different properties. They differ in durability, strength, weight, fire-and decay-resistance and, naturally, cost.

Wood, timber, brick, stone, concrete, metals, and plastics belong to the most popular building materials used nowadays. They all have their advantages and disadvantages that are taken into account when designing a structure.

    Wood belongs to naturally growing materials. It is known to be the oldest construction material and is still widely used for different purposes. Wood is popular since it has low weight and is easy to work. Besides, it grows naturally and is cheap. But its usage is limited because of its disadvantages: it easily burns and decays. As to stone, it also belongs to the oldest building materials. Among its advantages there are strength, high heat insulation and fire-resistance.

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

    is known to be one of the most popular building materials. It is produced by mixing cement, gravel, water, and sand in the proper amounts.

**№2 Скажите какие материалы искусственные, какие натуральные**

Metal, stone, brick, concrete, gravel, wood, sand, timber, iron.

**№3 Разделите качества на положительные и отрицательные**

High cost                        fire-resistance                  non-fire-resistance

Low resistance                low cost                           high strength

High weight                    durability                         corrosion-resistance

Heavy weight                  hardness                           softness

**№ 4 Ответьте на вопросы**

1. What do ferrous metals include?

2. Is iron the main component of non-ferrous metals?

3. What properties do metals possess?

4. Do the metals themselves differ from one another?

5. Is cast iron the cheapest of the ferrous metals?

6. What must an engineer carefully consider when he designs a steelwork?

7. Where must the steel framework be carefully hidden?

8. Is alloyed steel corrosion-resistant steel

9. What is it used for?

10. Is aluminum the oldest and best known light metal?

11. Do you know

**№ 5 Переведите текст**

**Building materials.**

Materials that are used for structural purposes should meet several requirements. In most cases it is important that they should be hard, durable, fire-resistant and easily fastened together.  
The most commonly used materials are steel, concrete, stone, wood and brick. They differ in hardness, durability and fire-resistance.  
Wood is the most ancient structural material. It is light, cheap and easy to work. But wood has certain disadvantages: it burns and decays.  
Stone belongs to one of the oldest building materials used by man. It is characteristic of many properties. They are mechanical strength, compactness, porosity, sound and heat insulation and fire-resistance.  
Bricks were known many thousands of years ago. They are examples of artificial building materials.  
Concrete is referred to as one of the most important building materials. Concrete is a mixture of cement, sand, crushed stone and water.  
Steel has come into general use with the development of industry. Its manufacture requires special equipment and skilled labor.  
Plastics combine all the fine characteristics of a building material with good insulating properties. It is no wonder that architects and engineers have turned to them to add beauty to modern homes and offices.  
Разделите все строительные материалы на три группы

Main building materials such as rocks and artificial stones, timber and metals.

Binding materials such as lime, gypsum and cement.

Secondary or auxiliary materials which are used for the interior parts of the buildings.

We use many building materials for bearing structures. Binding materials are used for making artificial stone and for joining different planes. For the interior finish of the buildings we use secondary materials.

**№ 6 Прочитайте текст и расскажите о достоинствах и недостатках древесины**

**Advantages of Wood**

Wood has been used as fuel for many thousand years and it is still being used as fuel mostly in the rural parts. Hardwood is preferred to softwood as fuel as it produces less smoke and burns longer. A woodstove or fireplace adds to ambience and warmth to a home.

Since the time of human beings began building shelters, wood has been a important construction material. It is also used to build houses and boats.

Until late of the 19th century all boats are made from wood; remains of wood are used commonly in boat construction. Engineered wood is being used in largely in construction of residential and commercial buildings. Wood is used as a supporting material in building made of other materials like in roofs, interior doors, etc.

Wood flooring is a product made from timber that is used as flooring. Engineered wood components are often used in construction and industrial applications. Wood has always been used for furniture like chairs and cots. It is also used in the form of cutlery like wooden spoon, chopsticks. Wood is also used as an artistic mode. It includes totem poles, woodcut printmaking, and certain types of musical instruments. Many types of equipments used in sports are made of wood. Example - Cricket bats, baseball bats. Other types of recreational sports equipments like skis, hockey sticks, archery bows are commonly made from wood.

**Disadvantages of Wood**

Wood energy produces green house gases. Transportation of wood to urban areas can be expensive. Wood is hygroscopic and it will absorb surrounding vapors loses moisture below the fiber saturation point. Biotic factors can cause decay of wood by mold fungi, bacteria and insects. A biotic factor like sun, wind, water, fire and certain chemicals can cause deterioration and destruction of wood.

**№7 Ответьте на вопросы**

[What are some of the advantages of wood?](https://www.quora.com/unanswered/What-are-some-of-the-advantages-of-wood)

[What are the advantages and disadvantages of working with wood?](https://www.quora.com/What-are-the-advantages-and-disadvantages-of-working-with-wood)

[What are the advantages and disadvantages of wood and bamboo in construction and furniture?](https://www.quora.com/What-are-the-advantages-and-disadvantages-of-wood-and-bamboo-in-construction-and-furniture)

[What are the advantages and disadvantages of using wood in an aircraft?](https://www.quora.com/What-are-the-advantages-and-disadvantages-of-using-wood-in-an-aircraft)

[What are the advantages and disadvantages of using wood as fuel?](https://www.quora.com/unanswered/What-are-the-advantages-and-disadvantages-of-using-wood-as-fuel)

**№ 8 Переведите текст**

**Wood details, advantages and disadvantages.**

    Wood has been a highly used building material since prehistoric times. Among other highly used construction materials there are concrete, steel, brick, stone, and plastics. They all differ in their properties and in the methods of usage.        Construction materials are known to differ in strength, hardness, fire-and corrosion-resistance durability, and, naturally, cost.

    Being the oldest building material, wood is also known to be the only naturally growing organic material. Is wood strong? Hardly so, because wood always contains some water which decreases its strength. But after the wood is cut, the water content starts to evaporate and as the water content decreases the strength of cut wood and its hardness start to increase. It is a well-known fact that the drier is the cut wood the greater is its strength and hardness.

   Trees are known to grow naturally, which makes wood a constantly renewable natural resource. Among other advantages of wood there are its low cost, low weight, and high workability. But, as any other construction material, wood has its disadvantages. The main ones are the following-it is not fire-resistant, it easily burns. Besides, it easily decays.

**№ 9 Переведите фразы**

1. Water content is known to decrease in the cut wood.
2. Wood as a structural material is considered to be highly used because of its low weight, low cost, and high workability.
3. Use of concrete for building purposes is announced to be constantly increasing all over the world.
4. The strength and hardness of cut wood are known to increase as its water content evaporates.

**№ 10 Переведите словосочетания**

Wood veneers                         laminated wood

Strip of land                            strips of wood glued together

**№11 Переведите текст**

**Timber and timber products**

Timber, arguably the original *building material*, retains its prime importance within the construction industry because of its versatility, diversity and aesthetic *properties*. About 20% of the earth’s land mass is covered by forests, divided roughly two thirds as **hardwoods** in temperate and tropical climates and one third as **softwoods** within temperate and colder regions. *Approximately* a third of the annual worldwide timber harvest is used in construction, and the rest is consumed for paper production, as, or wasted during the **logging process**.

The main **constituents** of timber are cellulose, hemicellulose and lignin, which are natural polymers. Cellulose, the main *constituent* of the cell walls, is a polymer made from glucose, a direct product of photosynthesis within the leaves of the tree. Glucose molecules *join* together to form cellulose chains containing typically 10,000 sugar units. Alternate cellulose chains, running in opposite directions to each other, form a predominantly well-ordered crystalline material. It is this crystalline chain structure which gives cellulose its **ﬁbrous properties**, and accounts for approximately 45% of the dry weight of the wood. *Commercial timbers* are deﬁned as hardwoods or softwoods according to their botanical classiﬁcation rather than their physical strength.Hardwoods are from broad-leafed trees, which in temperate climates are **deciduous**, losing their leaves in autumn, although in tropical climates, when there is little *seasonal variation*, old leaves are constantly being replaced by new. **Hardwood ﬂooring** has a proven track record for durability and aesthetic impact. Both solid timber and **plywood laminates** with a 4 mm hardwood wearing layer are commercially available. The standard timbers are the European oak, beech, birch, ash, chestnut, walnut and maple, but additionally some imported hardwoods with darker **grain colours** are available and interesting effects are produced with bamboo. The timbers are frequently offered with minimal knots and uniform graining or as rustic with knots and a larger *variation* of colour. Laminates are usually **preﬁnished** but solid timber may be sealed with oil or lacquer after installation on site.

Softwoods are from conifers, characteristically with needle-shaped leaves, and growing predominantly in the northern temperate *zone*. Mostly they are evergreen, with the notable exception of the European larch and they include the Californian redwood, the world’s largest tree with a height of over 100 metres. Western red cedar has long been the preferred timber for external timber cladding because of its durability and warm colour. However, recently the popularity of larch and Douglas ﬁr as softwood cladding has increased as *greater emphasis* is placed on the use of renewable resources from sustainable forests due to its moderate durability to decay and more resistance to impact damage.

**№12 Ответьте на вопросы**

1. Why is timber considered to retain its prime importance within the construction industry?
2. What climate areas do hardwoods and softwoods cover?
3. Which are natural polymers? Characterize each of them.
4. What is commercially available among hardwoods?
5. What kinds of trees are mentioned in the text?
6. How can you characterize softwoods?
7. What softwoods are preferable for external timber cladding? Why?

**№ 13 Переведите текст**

**Timber**

    Timber belongs to one of the oldest building materials. It has been from ancient times and is still produced from cut wood. Timber has always been highly usable in construction because of its many advantages. To these belong its strength, light weight, cheapness, and high workability. Its other advantage is that it belongs to natural resources and is naturally renewable. It is the more so that about a third of the world is still considered to be covered with forests. Besides, timber is resistant to corrosion produced by chemical substances in the modern polluted atmosphere.     One more advantage of timber is that it can be used for many construction purposes. But, naturally, timber has disadvantages and the main ones are that it is not fire-resistant and it easily decays; especially if it is not impregnated. Besides, freshly cut timber contains water that may cause great structural defects. Removal of water from timber is a necessary procedure that should take place before timber is used in practice. It increases strength and work-ability of the material and, of course, its durability.   What is timber mainly used for? Because of its many advantages it is highly used for producing window and floor frames, for flooring and roofing and other various woodwork. The two main types of timber are hardwoods and softwoods.    Of them, hardwoods are popular as materials used for decorative purposes: veneering in furniture and paneling. As to softwoods, they are mainly used for producing window and door frames and other kinds woodwork.

**№ 14 Ответьте на вопросы**

What structural materials does timber belong to?

What is it produced from?

What are the main advantages (disadvantages) of timber?

Why is removal of water from timber useful for construction purposes?

What are the two main types of timber?

What are softwoods (hardwoods) used for?

How much of the world’s land surface is considered to be covered with forests?

What countries are rich (poor) in forests?

**№ 15 Подберите английские эквиваленты русским словосочетаниям**

Surface waters, floor frame, roofer, chemical pollution, decorative purposes, surface cracks, strips of land, chemically polluted air, floor boards, roof iron, laminated panel.

Слоистая панель- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Кровельщик- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Поверхностные трещины- \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Полоски земли- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Химически загрязненный воздух- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Декоративные цели- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Химическое загрязнение- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Шпангоут- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Поверхностные воды- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Настил- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Кровельное железо- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**№ 16 Ответьте на вопросы**

1. How is concrete made?

2. What takes place when water is added to the cement?

3. Does the whole mixture set and harden when hydration takes place?

4. A solid mass is formed, right?

5. Do you know what is termed "aggregate"?

6. Is sand known as "fine aggregate"?

7. And what is meant by "coarse aggregate"?

8. Can concrete be made on a building site and poured into position as a wet mix

9. Are you able to explain what is meant by "in-situ" concrete?

**№ 17 Переведите диалог**

A.: Aluminum alloys of very high strength are obtainable, aren't they?

В.: They are, but such alloys are not generally used in structural engineering.

A.: Is corrosion from sea air or industrial pollution a problem?

В.: No, corrosion from sea air or industrial pollution is no longer a problem.

A.: So that means that painting is not necessary?

В.: You are right. Painting is not necessary at all.

**Тема 6. Искусственные строительные материалы.**

**№1Переведите текст**

**Plastics** are artificial materials used in construction work for a vast number of purposes\*. Nowadays plastics can be applied to almost every branch of building, from the laying of foundation to the final coat of paint. Synthetic resins are the main raw material for plastics. Plastics have some good advantages as they are lighter than metals, not subject to corrosion, and they can be easier machined\*. Besides, they are inflammable, they can take any colour and pattern, and they are good electrical insulators. Moreover, they possess a high resistance to chemical action.  
**Laminate** is a strong material manufactured from many layers of paper or textile impregnated with thermosetting resins. This sandwich is then pressed and subjected to heat. Laminate has been developed for both inside and outside use. It resists severe weather conditions for more than ten years without serious deformation. As a structural material it is recommended for exterior work. Being used for surfacing, laminate gives the tough surface.  
Foamed glass is a high-porosity heat insulating material, available in block made of fine-ground glass and a frothing agent. Foamed glass is widely used in prefabricated house building, to insure hest insulation of exterior wall panels, and in industrial construction. Foamed glass has a high mechanical strength, is distinguished by moisture, vapor and gas impermeability. It is non-inflammable, offers resistance to frost, possesses a high sound adsorption, and it is easily sewn and nailed. Structural foamed glass blocks designed to fill ceilings, and for making interior partitions in buildings and rooms, to ensure heat and sound insulation.

**№2 Подберите определения**

|  |  |
| --- | --- |
| 1) timber | a) a long thin flat piece of wood used for making floors, walls, fences etc: |
| 2) brick | b) a mixture of cement or lime, and sand and water, used in building for holding bricks or stones together |
| 3) clay | c) a metal that consists of two or more metals mixed together |
| 4) Board | d) a strong beam, made of iron or steel, that supports a floor, roof, or bridge |
| 5) Veneer | e) a hard block of baked clay used for building walls, houses etc. |
| 6) mortar | f) a type of rock that contains calcium |
| 7) sawdust | g) something that you hold in your hand and use to do a particular job |
| 8) alloy | h) a thick sticky liquid that comes out of some trees |
| 9) girder | i) wood prepared for use in building and carpentry |
| 10) raw materials | j) very small pieces of wood that are left when you have been cutting wood |
| 11) tool | k) the work or industry of getting gold, coal etc out of the earth |
| 12) resin | l) a type of heavy sticky earth that can be used for making pots, bricks |
| 13) limestone | m) a thin layer of wood or plastic that covers the surface of a piece of furniture made of cheaper material, to make it look better |
| 14) mining | n) an unprocessed natural product used in manufacture |
|  |  |

**Раздел 7. Химия в строительстве**

**№1 Ответьте на вопросы**

1. [How is chemistry used in construction?](https://www.answers.com/Q/How_is_chemistry_used_in_construction)
2. [What is the importance of chemistry to a carpenter?](https://www.answers.com/Q/What_is_the_importance_of_chemistry_to_a_carpenter)
3. [What is the importance of aluminum?](https://www.answers.com/Q/What_is_the_importance_of_aluminum)
4. [What is the importance of aluminum?](https://www.answers.com/Q/What_is_the_importance_of_aluminum)
5. [What careers are there in chemistry?](https://www.answers.com/Q/What_careers_are_there_in_chemistry)
6. [What are the harmful effects of chemistry?](https://www.answers.com/Q/What_are_the_harmful_effects_of_chemistry)

In construction, Engineers and constructors mix chemicals to create a solid concrete in making buildings, bridges, houses, roads, buildings. Chemistry is an essential science in the modern age. Its products fill our lives, and we use the end products of chemistry daily. We need to take a broad view when considering an answer. Chemical engineering is one career involving chemistry it is one massive area of chemistry and ranges from designing chemical related buildings on computers and contracting them to working at Cadburys and engineering how the chocolate stays in its condition etc. in choosing durable materials they choose good quality of materials so that when they build buildings, it will be durable, it is used in most of our manufacturing today. this includes cars, cans, buildings, etc. There are many toxic and hazardous chemicals. Chemical spills and chemical accidents cost money. And some injure or even kill people.

**№1 Переведите текст**

**Композитные материалы.**

A composite material (also called a composition material or shortened to composite, which is the common name) is a material made from two or more constituent materials with significantly different [physical](https://en.wikipedia.org/wiki/Physical_property) or [chemical properties](https://en.wikipedia.org/wiki/Chemical_property) that, when combined, produce a material with characteristics different from the individual components. The individual components remain separate and distinct within the finished structure, differentiating composites from [mixtures](https://en.wikipedia.org/wiki/Mixture) and [solid solutions](https://en.wikipedia.org/wiki/Solid_solution). The new material may be preferred for many reasons: common examples include materials which are stronger, lighter, or less expensive when compared to traditional materials. More recently, researchers have also begun to actively include sensing, actuation, computation and communication into composites, which are known as [Robotic Materials](https://en.wikipedia.org/wiki/Robotic_Materials). Typical [engineered](https://en.wikipedia.org/wiki/Materials) composite materials include:

[Reinforced concrete](https://en.wikipedia.org/wiki/Reinforced_concrete) and [masonry](https://en.wikipedia.org/wiki/Masonry)

[Composite wood](https://en.wikipedia.org/wiki/Composite_wood) such as [plywood](https://en.wikipedia.org/wiki/Plywood)

[Reinforced plastics](https://en.wikipedia.org/wiki/Reinforced_plastic), such as [fiber-reinforced polymer](https://en.wikipedia.org/wiki/Fibre-reinforced_polymer) or [fiberglass](https://en.wikipedia.org/wiki/Fiberglass)

[Ceramic matrix composites](https://en.wikipedia.org/wiki/Ceramic_matrix_composites) ([composite ceramic and metal matrices](https://en.wikipedia.org/wiki/Composite_armor))

[Metal matrix composites](https://en.wikipedia.org/wiki/Metal_matrix_composites) and other [advanced composite materials](https://en.wikipedia.org/wiki/Advanced_composite_materials_(engineering))

Composite materials are generally used for [buildings](https://en.wikipedia.org/wiki/Building), [bridges](https://en.wikipedia.org/wiki/Bridge), and [structures](https://en.wikipedia.org/wiki/Structure) such as [boat hulls](https://en.wikipedia.org/w/index.php?title=Boat_hulls&action=edit&redlink=1), [swimming pool panels](https://en.wikipedia.org/w/index.php?title=Swimming_pool_panels&action=edit&redlink=1), [racing car](https://en.wikipedia.org/wiki/Racing_car) bodies, [shower](https://en.wikipedia.org/wiki/Shower) stalls, [bathtubs](https://en.wikipedia.org/wiki/Bathtub), [storage tanks](https://en.wikipedia.org/wiki/Storage_tanks), [imitation](https://en.wikipedia.org/wiki/Imitation) [granite](https://en.wikipedia.org/wiki/Granite) and [cultured marble](https://en.wikipedia.org/wiki/Cultured_marble) [sinks](https://en.wikipedia.org/wiki/Sink) and countertops. The most advanced examples perform routinely on [spacecraft](https://en.wikipedia.org/wiki/Spacecraft) and [aircraft](https://en.wikipedia.org/wiki/Aircraft) in demanding environments.

**№2 Переведите текст**

**Properties of Glass as Building Material**

01. Glass Density:

The density of building glass is around 2500 kg per cubic metre at 200 C temperature, which gives flat glass a mass of 2.500 kg per square meter per mm of thickness.

02. Glass Compressive Strength and Tensile Strength:

The compressive strength of glass is 1000 N per Sq.mm (10197.2 Kg per Sq.cm) at 200 C temperature, which is very high.

03. Glass Young’s Modulus or Modulus of Elasticity:

The young’s modulus (Force per unit area) of any material is a measure it’s the stiffness. Larger the value of young’s modulus means stiffer the glass. The young’s modulus of glass is 70 GPa at 200 C temperature (The young’s modulus of concrete is 30 to 50 GPa  at 200 C temperature).

04. Glass Poisson’s Ratio:

Poisson’s Ratio is directly related to elongation and contraction of material when load is applied in one direction, and it is also known as lateral contraction co-efficient. The cross section area of glass decreases as it is stretched. The Poisson’s ratio of glass is 0.22.

05. Glass Linear Expansion or Co-efficent of Thermal Expansion:

Linear expansion is a stretch per unit length for a variation of 10 C temperature. The co-efficient of linear thermal expansion is 9 x 10-6 m/ 0 C.

The user can effectively choose correct application for glass after referring above mentioned points. Based on the important properties & characteristics it is considered as best future material for building construction.

**Раздел 8. Материалы из пластика.**

**№1 Переведите текст**

**Plastics**

  Materials other than reinforced concrete are also being widely used in modern construction for prefabrication. The plastics that were unknown only a few decades ago have become extremely important and widely used for construction purposes.  The plastics being used nowadays possess many advantages. First of all they extremely light and their tensile strength is greater than that of many metals.   Besides, they are weather-resistant and resistant to attacks by industrial fumes and to a great number of chemical substances. Some of the examples of the constructive use of plastic materials have been domes housing radar antennae and electronic equipment. Such domes built in America and Canada are as high as 116 feet.   The panels of the domes are made of polystyrene and polyurethane foam and are protected by glass cloth cemented to the fume panels with epoxy resin. Some other dome structures are made from panels of thin sheets of reinforced fiberglass. Up till that time fiber-glass was familiar as a roofing material. Now it is becoming more and more popular in the manufacture of panels. The methods by which plastic shapes are produced have led to a new approach to constructional and architectural forms.

**№1 Переведите текст**

**From the History of Metals.**

    Metals began to be widely used as construction materials not so long ago. Before the beginning of the nineteenth century metals played little structural role in the process of building. Mostly they served for joining parts of buildings. The ancient Greeks and Romans are known to use bronze for joining slabs of stone.

   It was only in the eighteenth century when the first all-metal structure was built in Europe. It was a cast-iron bridge across the river Severn in more than two centuries after its construction, it still carries heavy modern traffic across the Severn.

    In the first half of the nineteenth century cast iron and wrought iron were introduced and used for industrial construction in Europe and North America. Steel was not widely used, being considered a rare and expensive building material.   Inexpensive steel first began to be produced and used only with the invention of the Bessemer process, in the 1850s. From that period on, metal started to be used as rather popular and useful building material. The famous Eiffel Tower of Paris was constructed of wrought iron in 1889. By that period several steel frame skyscrapers had already been build in the United States. That was the beginning of the new era; a new highly useful and popular construction material had been born and introduced into building industry.

**№2 Ответьте на вопросы**

1. For what purposes were metals mostly used before the beginning of the nineteenth century?
2. What did ancient Greeks and Romans use bronze for?
3. When and where was the first all-metal structure built? What can you say about its present-day condition?
4. What kinds of iron were introduced in the first half of the nineteenth century?
5. Why was steel as a building material unpopular for a long period?
6. What is the essence of the Bessemer process?
7. What was the global result of its invention?
8. What material is the famous Eiffel Tower constructed of?
9. In what country were the first skyscrapers built?
10. Are they good to live in? Would you like to live in a skyscraper?

**№3 Образуйте глаголы от существительных**

Model: cutter-to cup; фреза

Caster-to \_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Joiner-to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Turner-to \_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Iron worker-to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_

Inventor-to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Introduction-to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_

Invention-to \_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Protection-to \_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Elimination-to \_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**№4 Переведите текст**

**Ferrous and non-ferrous metals**

    All metals, with the exception of mercury (ртуть), are hard-and fire-resistant. The common properties of metals being hardness and high fire-resistance, they are widely used in modern construction.   Metals are divided into two main groups: ferrous and non-ferrous. Iron, steel and their various alloys belong to the group of ferrous metals, while the main component of non-ferrous metals is not iron.   All metals have some common properties: they can be pulled, forged, and melted. They are also good conductors of electricity. Ferrous metals are commonly used for construction of supporting members. Steel and other ferrous metals serve as reinforcement in ferroconcrete constructions.   As to non-ferrous metals, their advantage is their being light. Metals possess high resistance.

**№5 Переведите слова**

Except, forge, meltable, mutability, ferrous, fusible, support, light, conduct, conductor

**№6 Переведите текст**

**Steel,aluminum. Alumina**

    What is steel as a construction material? Steel may be classified as iron with the controlled amount of carbon. The amount of carbon in steel is generally less than 1.7 per cent. Ordinary structural steel should contain less than three tenth of one per cent carbon. This king of steel also contains small amounts of phosphorus, sulfur, oxygen, nitrogen and silicon. Like iron and its alloys, steel belongs to ferrous metals. It is a hard substance. Accordingly, it can be pulled, forged, and melted. Generally, steel, this strong metal, like other metals, is a good conductor of electricity. Alloyed steel and stainless steel are corrosion-resistant kinds of steel.    Corrosion-resistant materials are known to be widely used for plant equipment, furnaces, valves, etc.   It should be noted that steel frames as a whole and their separate parts should be carefully designed: their function is to able to carry the loads imposed on them and supported by them.

**№7 Переведите термины**

Ordinary steel \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ordinary structural steel \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Controlled amount \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Controlled amount of carbon \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Alloyed steel \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Corrosion-resistant alloyed steel \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Steel frames \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Carefully designed steel frames \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Stainless steel \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Plant equipment produced of stainless steel \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sheet steel \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Generally used sheet steel \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**№8 Ответьте на вопросы**

What group of metals does steel belong to?

Wha8t substances can steel contain?

What amount of carbon does steel generally contain?

What materials can be used for producing plant equipment?

What is the construction purpose of steel frames? For what reason must they be carefully designed?

**№9 Переведите текст**

**Alloys in construction.**

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

    Aluminum and aluminum-based alloys are extremely popular and are widely used in various forms for construction purposes. The advantages of aluminum, compared with other popular metals, are its high strength combined with lightness. High-purity aluminum (about 99% pure) is soft and ductile but its great disadvantage is that it is not strong enough. At the same time it has high corrosion resistance and is used in construction of buildings as bright foil for heat insulation, roofing, exterior and interior architectural ornamentation.    And what about aluminum alloys? They are much more advantageous than pure substance, Aluminum alloys are mush harder and stronger than pure aluminum. Besides, pure aluminum is rather difficult to cast while many of its alloys are extremely easily cast. Pure aluminum is easily alloyed with other metals. And these combinations possess a great variety of usage. For example, when alloyed with copper, aluminum possesses additional strength. Unfortunately, it is mush less corrosion resistive than alloys with manganese, chromium, or magnesium and silicon.   One more advantage of aluminum is that it can be easily remelted over and over again.   Aluminum combined with oxygen forms a new oxide. Its name is alumina.

**№10 Образуйте антонимы**

Model:  powerful transfer-powerless transfer

Short distance- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Cheap foil- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Interior ornamentation- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Unnecessary details- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Comparable amounts- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dirty surfaces- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Pure atmosphere- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**№11 Определите достоинства и недостатки алюминия**

Duct ability, poor conductance, low durability, high corrosion resistance, high purity, low strength, high cost, low cost, excellent conductance, hardness, workability, poor purity, high strength.

**№12 Расскажите об алюминии по опорным вопросам**

1. Why was aluminum unpopular for a long period?
2. What good qualities does aluminum possess?
3. Where is aluminum in the form of bright foil used?
4. What are the advantages of aluminum alloys?
5. Can aluminum be remitted?
6. In what way is alumina produced?
7. What are its properties?
8. What does aluminum serve in power engineering for?

**Раздел 10. Кирпич. Свойства и применение.**

**№1 Переведите статью**

  Brick, stone, and timber are known are to be the oldest building materials. Bricks belong to artificial (man-made) materials. Their production started in prehistoric times. Since then they have been produced and tested in all types of climate and in many countries. Thousands of years ago the builders in Egypt already knew the advantages of bricks and used them for construction. In those days the production of bricks was quite different from the modern one: bricks were produced not by burning but by drying in the sun, there being much sunshine in Egypt all the year round. Bricks work was also popular in Rome, there being very few growing forests and as a result little timber there.

    In modern times bricks can be made of concrete, mortar, of burnt clay and of a combination of some other substances. For example, different types of clay and shale can be used as raw materials. Accordingly, bricks produced nowadays have different sizes, shapes, colours, and textures. Bricks also vary with the method of fabrication and temperatures of burning. It should be noted that some types of brick, such as, for example, salmon bricks are underburnt and highly porous.   Naturally, their strength is extremely poor. This property of salmon bricks should be taken into account when choosing brick material for construction. But there exist many other types of brick that are extremely strong and almost glass hard. Between these extremes there lie some other types of bricks with different properties. Bricks properties are of great importance and should be taken into account while choosing material for construction purposes.

**№2 Задайте вопросы соседу**

1. What building materials are considered to be the oldest ones?
2. What natural (man-made) materials are used for construction nowadays?
3. Is bricks a newly produced or an ancient building material?
4. In what countries are rich (poor) in raw materials?
5. What properties of bricks should be taken into account when choosing material for building purposes?

**№3 Выберите правильный вариант и заполните пропуски**

Shale and clay belong to (natural, man-made) \_\_\_\_\_\_\_\_\_\_ materials.

(Metal and glass, clay and mortar) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are used for fabricating bricks.

In (prehistoric, modern) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ times bricks (are, were) \_\_\_\_\_\_\_\_\_\_ made by (drying in the sun, burning) \_\_\_\_\_\_\_\_\_\_.

Russia is extremely (rich, poor) \_\_\_\_\_\_\_\_\_\_\_\_ in raw materials.

There were (many, few) \_\_\_\_\_\_\_\_\_ growing forests in Rome in prehistoric times.

Bricks (are extremely different, do not differ) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in size, colour, and texture.

**№4 Переведите словосочетания**

Extremely strong and glass hard bricks \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Under burnt and highly porous bricks\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Clay and shale used as raw materials \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Bricks produced by drying in the sun \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Bricks made of mortar and burnt clay \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Few forests and little timber \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Many forests and much timber \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Polluted atmosphere and polluted soil \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Eco-friendly production and eco-friendly usage \_\_\_\_\_\_\_\_\_\_\_\_\_\_

(eco-friendly-экологически благополучный)

**№5 Переведите текст**

**Brick Classifications**

Bricks may be classified in accordance with their uses as commons, facing and engineering bricks. Commons are sufficiently hard to carry the loads but they have a dull texture or are a poor colour. Commons are used for internal walls that are not usually exposed to view. Facing bricks can carry normal loads, are capable of withstanding the effects of rain, wind and frost without breaking up and have a pleasant appearance. Engineering bricks are made from specially prepared clay. They are very solid and hard are capable of safely carrying much heavier loads than other type of brick. These bricks are mainly used for walls carrying exceptionally heavy loads, for brick piers and general engineering works .A range of special bricks are made for specific uses in fair face brickwork

**№6 Переведите предложения**

1. Construction of the bridge is expected to begin next spring.
2. Salmon brick being under burnt and highly porous, it cannot be recommended for wide use.
3. Design work is known to be finished by this fall (autumn)
4. Terracotta exists in a wide variety of colour, their colour depending on the colour of glaze they are covered with.
5. Safety zones are said to be built in the nearest future.
6. Brick, stone, and timber being the oldest construction materials, they have been and are widely used all over the world.

**№7 Переведите текст**

**Керамика.**

One of the first solid materials, if not the very first, that man learned to use was ceramic natural stone. It was used in a variety of applications because of its characteristic properties such as hardness, strength to chemical attack which make it comparatively easy to shape. Ceramic material have been extended greatly. They range from dull clay to lustrous ruby, from the refractory linings to electronic control devices.

What is ceramics? Can this question be answered? Essentially it is defined as a combination of one or more definite metals with a non-metallic element, usually oxygen. The comparatively large oxygen atoms serve as a matrix with the small metal atoms. The main characteristic of the construction of ceramic crystals is that the atoms are linked by bonds that are primarily ionic but also to a significant extend covalent. These bonds are responsible for the stability and strength of ceramic materials. Many ceramic materials are being mass-produced now. They can be drawn into rods, cast or pressed. These ceramics are light in weight, but very strong. Some of tem are so hard that they can cut steel. You can hardly find any branch of industry where ceramic products are not used.

**№8 Расскажите о видах раствора**

**Строительный раствор.**

**1. Bricklaying or Stone Laying Mortar**

This type of mortar used to bind bricks and stones in masonry construction. The proportions of ingredients for bricklaying or stone laying mortar is decided based on kind of binding material used.

**2. Finishing Mortar**

Finishing mortar is used for pointing and plastering works. It is also used for architectural effects of building to give aesthetic appearances. The mortar used for ornamental finishing should have great strength, mobility and resistance against atmospheric action like rain, wind, etc.

**3. Cement Mortar**

Cement is used as a binding material in this type of mortar and sand is employed as aggregate. The proportion of cement and sand is decided based on the specified durability and working conditions.

Cement mortar will give high strength and resistance against water. The proportion of cement to sand may varies from 1:2 to 1:6.

**4. Lime Mortar**

In this case, lime is used as binding material. There are two types of limes namely fat lime and hydraulic lime. Fat lime in lime mortar requires 2 to 3 times of sand and it is used for dry work.

Hydraulic lime and sand in 1:2 ratios will give good results in damp conditions and also suitable for water logged areas.

**5. Gypsum Mortar**

Gypsum mortar consists of plaster and soft sand as binding material and fine aggregate. Commonly, it has low durability in damp conditions

**6. Gauged Mortar**

In gauge mortar combination of lime and cement is employed as a binder material, and sand used as fine aggregate. Gauge mortar is, essentially, lime mortar which its strength increased by adding cement.

**7. Surkhi Mortar**

In surkhi mortar, lime is used as binder material and surkhi is employed as fine aggregate. The surkhi is finely-powdered burnt clay which provides more strength than sand and cheaply available in the market.

**8. Aerated Cement Mortar**

Basically, it is cement mortar to which air entraining agent is added to increase plasticity and workability. The resulted mortar is termed as aerated cement mortar

**9. Mud mortar**

In this type of mortar, mud is used as binding material and saw dust, rice husk or cow-dung is used as fine aggregate. Mud mortar is useful where lime or cement is not available

**10. Heavy Mortar**

Generally heavy mortar is used as fine aggregate in this type of mortars.

**11. Lightweight Mortar**

Lightweight mortar is prepared by mixing lime or cement as binder, sand, and saw dust, rice husk, jute fibers, coir, or asbestos fibers.

Based on Strength (ASTM C 270)

**12. Type M Mortar**

It is used for exterior masonry work and at or below grade application where substantial gravity or lateral loads are exerted. Load bearing wall, footing, retaining wall are examples of below grade applications.

**13. Type S Mortar**

Type S mortar has great durability that is why it is highly suitable for locations where the masonry is in contact with the ground, such as paving or shallow retaining walls.

**14. Type N Mortar**

Type N mortar used for reinforced interior and above-grade exterior load-bearing walls on which normal loads are imposed.

**15. Type O Mortar**

Type O mortar employed for interior non-load-bearing applications with very limited exterior use. Added to that, it used for repointing the structural integrity of the wall is intact.

Based on Special Purpose of Mortars

**16. Fire Resistant Mortar**

Fire resistant mortar is prepared by mixing aluminous cement to the fine powder of fire bricks. If there are any fire warnings to the structures in a particular zone, then fire resistant mortar will be used which acts as fireproof shield.

**17. Packing Mortar**

This type of mortar is used to pack the oil wells. Packing mortar should be of high homogeneity, water resistance and high strength.

**18. Sound Absorbing Mortar**

It is used to reduce the noise level and acts as sound proof layer.

**19. X-ray Shielding Mortar**

This is heavy type mortar with bulk density around 22KN/m3. Fine aggregates from heavy rock and suitable admixtures are used to prepare this type of mortar.

**20. Chemical Resistant Mortar**

are so many types of chemical resistant mortars can be prepared but the selection of mortar is dependent on expected damage by particular chemical or group of chemicals.

**Раздел 11. Бетон. Виды и свойства бетона**

**№1 Переведите статью, составьте план пересказа**

    Concrete is considered to be a universal material for construction. Different kinds of concrete can be used practically for every building purpose. The raw materials for producing concrete can be found in every part of the world. The main property that makes concrete so popular is that it can be formed into strong monolithic slabs. Another good quality is it’s relatively low cost. Besides, Concrete is known to be fire-and decay-resistant.     Concrete is produced by combining coarse and fine aggregates, Portland cement, and water. Coarse aggregate is generally gravel or crushed stone, and fine aggregate is sand. Cement, sand, gravel, and water are taken in proportional amounts and mixed. The quality of concrete depends mostly on the quality of the cement used. The process of production consists in pouring the mixed components into forms and holding them there until they harden. The process of hardening generally lasts for about 28 days.     There exist different ways of producing concrete. It can be produced by mixing the ingredients and pouring the mixture into position on the very site of building. Concrete can also be produced in a factory, and used as a material for manufacturing prefabricated blocks. Accordingly, there exit the so-called in-situ (cast-in-place) concrete and precast concrete.     Concrete, as any other building material, has not only advantages but also disadvantages. Its main disadvantage is that it has no form of its own. Also, it does not possess useful tensile strength. Because of these qualities, in modern times construction concrete is very frequently combined with different metals. Most common of them are iron and steel.

   The introduction of metal into the structure of concrete is highly advantageous. It strengthens the material and helps to realize its limitless construction and architectural potential. It should be noted that the use of Ferro-concrete started only in the nineteenth century and is still gaining popularity.

**№2 Дайте ответы на вопросы**

1. What properties make concrete a highly used construction material?
2. What two types of aggregate are used for producing concrete?
3. Is sand a coarse or fine aggregate?
4. What ingredients does the quality of concrete depend upon?
5. How long does the process of hardening the mixed components last?
6. What is the difference between the so-called in-situ and precast concrete?
7. What quality is considered to be the main disadvantage of concrete?
8. For what reason is tensile strength considered to be an important quality?
9. For what purpose are metals introduced into the structure of concrete?
10. What metals is concrete frequently combined with?

**№3 Переведите термины**

concrete slab, slab roof, tensile strength, site of foundation, slab covering

бетонная плита, кровля из плит, настил из плит, пласт под фундаментом, прочность на растяжение

**Раздел 12. Части здания.**

**№1 Найдите правильный вариант ответа**

1.The roofs serve

for ornamental purposes

for protecting the interior of the building

2.The pitched roofs

do not dry themselves quickly of water

dry themselves quickly of water

3.The covering of pitched roofs consists of

small individual units

large heavy units

4.The advantages of flat roofs are

that they can cover very broad buildings

that they can serve as balconies and decks

5.In modern constructions the variants of the ceilings

limited

limitless

6.Nowadays ceilings are produced of

artificial materials

both natural and artificial materials

7.Ceilings may be attached to

wood joists

wood joists, steel joists, and wood rafters

8.Suspended ceilings are produced of

various boards made of fibers

gypsum, board, plaster and boards made of fibers

9.Mechanical and electrical systems

can be subject to frequent change and damage

are never subject to frequent change and damage

**№2 Переведите текст**

**Foundations**

Foundations are elements that affect a transition between the building and the ground. There are three general areas of importance in foundation design.1.The nature of the structure that must be supported.2.The nature of the ground.3.The structural actions of foundation elements, involving internal stresses and strains and the means by which they achieve the transfer of loads to the ground. Most foundations consist of some elements of concrete, because of the relative cost of the material and its high resistance to water, rot, etc. The two general types of foundations are shallow bearing foundations and deep foundations. With shallow founda­tions load transfer occurs near the bottom of the building; with deep foundations it involves soil strata at some distance below the building. The most common types of shallow foundations are wall and column footings, consisting of concrete strips and pads that are poured directly on the ground directly supporting structural elements of the building. Sometimes several structural elements of the building may be supported by a single large footing. Such a foundation does literally float on the soil and is called a raft. If the soil at the bottom of the building is not adequate for the load transfers, it becomes necessary to utilize the resistance of lower soil strata. In this case builders have to go all the way down to bedrock, or merely to some more desirable soil layer. In order to accomplish this, the building is simply placed on stilts, or tall legs, in the ground. The two basic types of elements that are used for this are piles and piers. Piles are elements that are driven into the ground. Piers are shafts that are excavated and then filled with concrete.

**№3 Ответьте на вопросы**

1. What are foundations?

2. What are the main important factors in foundation design?

3. What is the most common material in foundations?

4. What is the difference between shallow bearing foundations and deep foundations?

5. What are the most common types of shallow foundations?

6. What is a raft?

7. When do builders utilize the resistance of lower soil strata?

8. What do they do in this case?

9. What do we call “piles” and “piers”?

**№4 Заполните пропуски**

Foundations keep both the (стены и пол) \_\_\_\_\_\_\_\_\_\_ from the contact with the (почва) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Sinking may cause (трещины) \_\_\_\_\_\_\_\_\_\_ in the walls of a building.

Foundation design may be both (весьма сложный) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and (весьма простой) \_\_\_\_\_\_\_\_\_\_.

The foundations (поддерживаю) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ both dead loads and (динамический вес) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of buildings.

The dead load (включает в себя) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the (вес) \_\_\_\_\_\_\_\_\_\_ of electrical and mechanical (оборудование) \_\_\_\_\_\_\_\_\_\_\_\_\_

**№5 Переведите на русский язык приведенные ниже существительные:**

advantage, aggregate, alloy, amount, bar, binder, brick, builder, building, carbon, cement, change, clay, column, compression, concrete, crushed rock, degree, fatigue, force, gravel, hole, iron, kind, layer, limestone, masonry, mixture, mortar, Portland cement, proportion, quantity, rod, sand, shape, steel, stone, strength, stress, tendency, tensile strength, tension, tile, time, use, weight, wood, result

**прилагательные и наречия:**

available, constant, different, difficult, further, important, modern, natural, similar, sometimes, together, versatile, all

служебные слова и обороты:

after, as, for, from, some, such as, thus, under, which, while, when, for example, that is, each other, other, now, together

глаголы:

appear, bind, calculate, eliminate, increase, lose, mix, pour, produce, pull, pull apart, rust, spray, strengthen, limit

**№6 Расскажите о каждом виде крыши**

Названия типов крыш на английском языке с переводом

dome roof *,* flat roof *,* gable roof *,* hip roof *,* hip-and-valley roof *,* lean-to roof *,* monitor roofpavilion roof *,* pitched roof *,* rotunda roof

купольная крыша, двускатная крыша, шатровая крыша, крыша сложной формы, плоская крыша, односкатная крыша, крыша с фонарем, двускатная крыша, крыша с четырьмя равными скатами

**№7 Переведите текст**

**1.Ceiling**

Ceilings are considered to be extremely important parts of any room. A well-designed ceiling is one of the most pleasing features of a room. In modern constructions the variants of ceilings are limitless.

Ceilings can be produced of many various materials both natural and artificial. Their colours, texture, pattern, and shape are of great importance for the visual impression of the room. Ceilings of any materials may be attached to wood joists. Usually they are attached very carefully and tightly. They may be attached to wood joists, wood rafters, or steel joints.

A ceiling can be a simple, level plane. Or it can be two or more sloping planes. It should be noted that these planes correspond to the form of the roof construction above.

The ceiling surface is an important functional component in any room. It can have a luminous surface or a richly ornamented and decorated surface. It is of importance to note that it should be constructed in such a way as to help control the spread of light and sound about the room. One more important feature of the ceiling surface is its resistance to the spread of fire.

**2. Suspended plaster ceiling.**

Suspended plaster ceilings have been in use already for several decades. How are suspended ceilings characterized? Suspended ceiling is a finish ceiling. It is hung on wires from the structure above, some distance below the room structure. It can be hung level and flat.

As for girders, beam, joists, and slabs above, they can be of varying sizes.

Suspended ceilings can be produced of almost any materials. Among them the most widely used are gypsum, board, plaster, and various boards made of fibers. Each of these materials is supported on its own system of small steel framing members. The framing members, in their turn, are hung from the structures on heavy and strong steel wires.

Suspended plaster ceilings are rather popular in modern constructions of different kinds.Ceilings produced of fibrous materials are classified as acoustical ceilings. Their most useful property is high absorption of sound energy. As to plaster of gypsum board ceilings, they are highly reflective of sound energy.

**№8 Переведите текст**

**Floor structure in steel-framed buildings.**

A multi-storey building comprises a number of floors which are erected one above the other and which, in a framed structure, are supported at certain specific points. The vertical and horizontal forces acting upon the framework are transmitted to the foundations. From the structural point of view, a floor in a framed building consists of a number of floor bays. The following shapes on plan may be distinguished: Square concrete slab The simplest type of construction is the solid concrete slab. With long spans, such slabs tend to be very thick and heavy. To reduce weight, the slab may be formed with internal cavities or composed of a system of one-way or two-way ribs joined together by a relatively thin top layer of concrete, the latter being described as a waffle slab. The load transmission conditions being approximately the same in both directions, a planning grid with a square mesh is often adopted, this being typical of in-situ concrete construction. Rectangular floor bay The structural steel floor comprises the floor slab and the beams that support it. It is characteristic of steel-framed buildings that the floor beams transmit the loads in one direction only and that the floor slabs are generally supported, on two sides. To construct a grillage for equal load transmission in both directions involves considerable effort in structural steelwork, as it is necessary to cut the intersecting beams at every junction and connect them again in a manner suitable to transmit the loads. n general, the weight of the slab should be as low as possible. To achieve this, the supporting beams must be quite closely spaced, so that the actual slab spans only short distances. The typical component of the floor structure of a steel-framed building is the narrow elongated floor bay. The span of the floor beams is generally between 6.00 and20.00 m, while the width of the bays varies from 1.50 to 3.00

**№9 Ответьте на вопросы к тексту.**

1. What does a multi-storey building comprise?

2. Where are floors supported?

3. What kinds of forces are transmitted to the foundations?

4. What is the simplest floor shape?

5. How can the weight of the floor slab be reduced?

6. What is typical of in-situ-concrete construction?

7. What does the structural steel floor comprise?

8. Why does construction of a grillage for equal load transmission in both directionsinvolve considerable effort?

9. How can low weight of the slab be achieved?

10. What are the general dimensions of an elongated floor bay?

**№10 Переведите текст и составьте вопросы к тексту**

**Walls**

Walls are the most important structural elements of buildings, which serve not only as vertical enclosing structures, but also often bearing elements on which the floors and coatings are based. By the nature of the materials used, the walls can be stone (made of artificial and natural stones), wooden, ground and synthetic materials.

By the nature of the walls are load-bearing, self-supporting and hinged. The carriers are the walls, which act not only as protections; they also underpin the design of the cover or ceiling. When the design scheme, with self-supporting walls, the vertical load from the slabs perceive pillars or columns. The walls carry only the enclosing function. In this case, they perceive horizontal wind loads, which transmit them to the frame structure (beams and columns). Such walls only accept loads from the upstream wall. The use of curtain walls, which perform only enclosing functions, is typical for frame buildings.

According to the design and method of construction of stone walls are divided into four groups: of small elements (small stones); of large stones (blocks); monolithic and large-panel.

**№11. Переведите текст и составьте вопросы к тексту**

**Columns in walls**

A common problem in the design of building foundations is a foundation wall that must share its location with a row of columns. This takes place along the exterior walls of buildings with frame struc­tures. When loads are transferred to the ground there are various possibilities for the relationships between the columns, the wall, and the foundation elements. The column loads may be light, as in the case of a one-storey building with light construction and short spans or the column loads may be large, as in the case of a multi-storey building.

**№12 Ответьте на вопросы к тексту**

1. What kind of a foundation wall is a common problem in the design of building foundations?

2. Where does this problem occur?

3. When are column loads light?

4. When are column loads large?

5. When is usually the wall designed as a spanning element?

6. How is the total footing load estimated in the example?

**№13 Переведите текст и составьте вопросы к тексту**

**Slabs**

With any construction technique, problems often appear and procedures have to be developed which can overcome these in a practical and efficient way. This has been the same in the case of high-rise buildings. Often, different methods are adaptable to the same situation. Several techniques have been developed for placing the reinforcement as well as grouting. One sequence involves laying walls to storey height and placing the slabs on the ungrouped masonry. Then the vertical reinforcement is placed into the block cells, ensuring that it projects above the finished floor slab to serve as dowels for the next storey walls. This is a very efficient method, but the unreinforced wall possesses relatively little stability and can be easily damaged when the floor slabs are being placed on it. A safer method involves building the masonry walls to full height with the reinforcement located in the walls as the masonry units (brick or block) are laid up. Grouting is then accomplished in full-storey height lifts. The dowels projecting above the slab must be precisely centered in the wall so that when the slabs are lowered into position, the projecting do wells do not interfere with them. In another procedure, the grouting is stopped a short distance below the floor line, dowels are placed in the grout space, and this space is solid grouted after the slabs have been positioned. Thus, the slabs can be placed without dowels positioned earlier

**№14 Ответьте на вопросы**

1. What is typical with any constructional technique?

2. What is the first construction technique described?

3. What is its drawback?

4. Is there a safer method?

5. What is it?

6. What is the second method described?

7. What is the advantage of this method?

8. What other method of tying the slabs together is there?

**№15. Переведите следующие слова на английский язык**

класть, устанавливать, в качестве, другой, разрушать, элемент каменной кладки, полезный, эффективный, относительно, устойчивость, размещать, преодолевать, сваривать, скреплять, тянуться, так же как и, опускать, надёжный, высотой в этаж.

**№ 16 Переведите текст и составьте вопросы к тексту**

Brickwork is one of the oldest ways of building construction, and today there are different types of brickwork – both rough and front. Also, the strength, reliability and durability of buildings and structures depends on the type of brick laying. In our next article we will reveal the questions about the methods of dressing, types of lining of facades with bricks and consider the key features of each type of installation.

**№ 17 Переведите текст**

**Windows**

There are different types of windows used in building construction to provide ventilation, and view. The selection of windows depends on many criteria.

Types of Windows used in Buildings

There are so many types of windows are available based on their positions, materials and functioning. Windows are classified as follows.

**1. Fixed Windows**

Fixed windows are fixed to the wall without any closing or opening operation. In general, they are provided to transmit the light into the room. Fully glazed shutters are fixed to the window frame. The shutters provided are generally weather proof.

**2. Sliding Windows**

In this case, window shutters are movable in the frame. The movement may be horizontal or vertical based on our requirement. The movement of shutters is done by the provision of roller bearings. Generally, this type of window is provided in buses, bank counters, shops etc.

**3. Pivoted Windows**

In this type of windows, pivots are provided to window frames. Pivot is a shaft which helps to oscillate the shutter. No rebates are required for the frame. The swinging may either horizontal or vertical based on the position of pivots.

**4. Double Hung Windows**

Double hung windows consist of pair of shutters attached to one frame. The shutters are arranged one above the other. These two shutters can slide vertically with in the frame. So, we can open the windows on top or at bottom to our required level.

**5. Louvered Windows**

Louvered windows are similar to louvered doors which are provided for the ventilation without any outside vision. The louvers may be made of wood, glass or metal. Louvers can also be folded by provision of cord over pulleys. Generally, they are provided for bathrooms, toilets and privacy places etc..

**6. Casement Windows**

Casement windows are the widely used and common windows nowadays. The shutters are attached to frame and these can be opened and closed like door shutters

**7. Metal Windows**

Metal windows, generally mild steel are used for making metal windows. These are very cheap and have more strength. So, now days these are widely using especially for public buildings, private building etc. Some other metals like aluminum, bronze, stainless steel etc. also used to make windows. But they are costly compared to mild steel windows.

**8. Sash Windows**

Sash window is type of casement window, but in this case panels are fully glazed. It consists top, bottom and intermediate rails. The space between the rails is divided into small panels by mean of small timber members called sash bars or glazing bars.

**9. Corner Windows**

As in the name itself corner windows are provided at the corners of room. That means corner windows has two faces in perpendicular directions. By providing this type of windows, light or air can be entered into room in two different directions.

To provide this type of window special lintel is provided in the wall. Corner windows will give aesthetic appearance to the building.

**10. Bay Windows**

Bay windows are projected windows form wall which are provided to increase the area of opening, which enables more ventilation and light form outside. The projection of bay windows are of different shapes. It may be triangular or rectangular or polygonal etc. They give beautiful appearance to the structure.

**11. Dormer Windows**

Dormer windows are provided for sloped roofs. These are projected from the sloping surface as shown in below image. They provide ventilation as well as lighting to the room. They also enhance aesthetic sense of room.

**12. Clerestory Windows**

If the rooms in a building are of different ceiling heights, clerestory windows are provided for the room which has greater ceiling height than the other rooms. The shutters able to swing with the help of cord over pulleys. These also enhances the beauty of building.

**13. Lantern Windows**

Lantern windows are provided for over the flat roofs. The main purpose of this window is to provide the more light and air circulation to the interior rooms. Generally, they are projected from the roof surface so, we can close the roof surface when we required.

**14. Gable Windows**

Gable windows are provided for sloped roof buildings. These windows are provided at the gable end of sloped roof so; they are called as gable windows. They also improve the appearance of building.

**15. Ventilators**

Ventilators are provided for the purpose of ventilation in the room. They are provided at greater height than windows nearer to roof level. It is in very small size. Horizontally pivoted shutters are provided for ventilators. Sometimes shutter is replaced by wired mesh, in this case sunshade is provided to prevent against rain water.

**16. Skylights**

Skylights or generally provided on the top of sloped roofs. To admit light into the rooms, sky lights are provided. It is provided parallel to the sloping surface. Sky lights can be opened when we required. Lead gutters are arranged to frame to make it as waterproof.

**№18. Переведите текст и расскажите о каждом виде оконных рам.**

**Vinyl Window Frames**

  Benefits: [vinyl windows](https://modernize.com/windows/frames/vinyl-windows) are windows with frames made out of PVC (polyvinyl chloride), the same material used to make pipes and fittings for plumbing. The material is extruded into a straight shape and then crafted into a window frame and filled with glass. Vinyl windows are affordable and they are known for being good insulators.

Drawbacks: These aren’t the most durable option, and they don’t have the same aesthetic charm as wooden windows or aluminum windows. They aren’t quite as strong as fiberglass, wood or aluminum, even when made with the best design practices.

**Aluminum Window Frames**

Benefits: [Aluminum windows](https://modernize.com/windows/frames/aluminum-windows) are known for being rugged and long-lasting. They are also more modern and work well with sleek and modern style. They let in plenty of sunlight and are low-maintenance, especially when they aren’t painted. They won’t wear out in sunlight, and they won’t rot or mold from the common wear problems that affect wood, vinyl or fiberglass windows.

Drawbacks: Aluminum windows aren’t very efficient, even though manufacturers do everything they can to boost those efficiency figures. When compared to other options, they fall short in terms of efficiency. They are also quite expensive. You’ll spend more for aluminum windows than you will for vinyl or fiberglass, though they are usually a bit cheaper than wooden windows.

**Fiberglass Window Frames**

Benefits: [Fiberglass windows](https://modernize.com/windows/frames/aluminum-windows) are a less common but durable option, and they’re relatively simple to maintain. The windows are made from extruded fiberglass sections and the frames are a similar shape to vinyl frames. Fiberglass windows are known to resist weather and temperature changes better than any other material. That’s because fiberglass is so close in composition to the glass panes used to make up windows, so both materials expand and contract about the same amount during temperature changes. Fiberglass is an excellent insulator and makes window frames that work to prevent the transfer of heat.

Drawbacks: Unlike wood or aluminum, fiberglass is a bit dull in appearance. This can be remedied by painting it a different color, but many people still don’t find it as charming. The material is also quite expensive and can cost as much as or more than aluminum or wooden windows. Fiberglass is much more expensive than vinyl windows are for a very similar look, and that’s why so many people end up with vinyl frames in their homes.

**Wooden Window Frames**

Benefits: [Wooden windows](https://modernize.com/windows/frames/wood-windows) are just as durable and long-lasting as other window frame options when properly maintained. They’ve been used on homes for hundreds of years, and though they’ve adapted to modern standards, they still offer the same general strength and aesthetic appeal that they always have.

Drawbacks: Compared to vinyl or fiberglass windows, wooden windows are pretty expensive. They also require maintenance. For instance, if you fail to repaint the windows when needed, they can suffer from severe expansion and contraction due to moisture changes in the wood. They are also susceptible to rot and weathering in certain climates.

**№19. Переведите текст и составьте вопросы к тексту**

**Types of floor systems**

Floor systems not only support the vertical loads but they also serve as the horizontal diaphragms which distribute the lateral forces to the shear walls. There are several different types of floor systems: Cast-in-place slabs The simple cast-in-place slab floor system is sometimes used where there are irregular floor designs that would make it difficult to form similar precast units. It provides a good structural tie without requiring any specific type of a joint. Prestressed elements Precast prestressed tees are a different type of system. They provide economic allong spans giving open space below that can be easily divided with partitions. A topping slab provides both a finished floor surface and a tie, so that the system functions as a diaphragm. This cast-in-place topping slab must be thick enough so that the reinforcement within it can achieve adequate bond to the concrete. Steel bar joists The system uses steel bar joists which support a concrete floor slab or a metal deck with a concrete topping surface. It is useful where some space between the ceiling and floor deck above for different kinds of services is required. Lift-on slab A lift-on slab, usually of full room size, has proven to be economical and efficient. Such slabs do not require a topping or finish since the floor surface and ceiling finish are part of the slab

**№20 Ответьте на вопросы**

1. Which functions do floor systems perform?

2. When is cast-in-place slab floor system used?

3. When are precast prestressed tees used?

4. Why must cast-in-place topping slab be thick?

5. What is the reason for the use of steel bar joists?

6. What are the advantages of a lift-on slab?

**№21. Переведите текст на английский язык**

Обустройство пола – это один из основных этапов внутренней отделки любого помещения. Дерево – это натуральный, природный материал, превосходно подходящий для обустройства полов, как в городских квартирах, так и в загородных коттеджах. Дерево обладает способностью поддерживать оптимальный микроклимат в помещении. В условиях повышенной влажности деревянные полы впитывают влагу, а затем аккумулируют её, по мере необходимости. Деревянные полы позволяют не только сохранять тепло, но и обладают высокой звукоизоляцией. Это качество делает дерево оптимальным решением для отделки пола. Материалом для обустройства полов может стать дерево любых пород, как обычная сосна, так и редкие сорта – кедр, красное дерево и т.д. Монтаж деревянных полов не потребует много времени. Прочность и надёжность деревянных полов позволяет значительно продлить их срок эксплуатации. В отличие от таких покрытий, как ламинат, деревянные полы способны прослужить в течение многих лет. К тому же, деревянные полы отличаются простотой в уходе и не требуют сложного ремонта. Поверхность можно неоднократно циклевать.

**Раздел 13.. На строительной площадке.**

**№1Переведите текст**

In the construction of any structure the first step is to make a careful survey of the site and to examine the soil. It is also necessary to clear the site, to erect excessive roads, to deliver building materials. After preparatory work the builders lay the foundation and erect the walls, the floors, the roof of a building. The last stage of construction includes finishing work and installation of various facilities for gas, water and sewage services. Construction work usually involves a large number of people of various build-ing trades. Bricklayers, plumbers, welders, plasterers, painters, carpenters, engineers work on a construction site. Most of the site operations are mechanized and reduced to a minimum. Many structures are assembled of precast elements. Builders use different building machines in the process of construction. Bull-dozers level the ground. Cranes hoist structural elements and place them into position. Lorries and trailers deliver building materials to the site. Bricklayers build the walls and other parts made of bricks. Plumbers fix all the baths, water pipes and the sanitary fittings. Electricians run electric wires. Welders are employed in welding structural elements. All the doors and window-frames are made by carpenters and put into their places by joiners. Plasterers put plaster or cement over all the walls and ceiling and make them smooth. Painters and decorators carry out finishing work.

**№2 Переведите текст**

**Construction site equipment**

Prior to the beginning of any work, the construction site and hazardous work areas outside it are protected in accordance with the requirements of regulatory documents.

At the entrance to the site should be installed information boards indicating the name of the object, the name of the developer (customer), contractor (contractor, General contractor), the name, position and phone numbers of the responsible produce La works on the object and submit La body gosarhstroynadzor or local government in charge of construction, the timing of the beginning and end of work, the scheme of the object.

The name and phone number of the executor of works are put also on boards of inventory protections of places of works out of a building site, mobile buildings and constructions, large-size elements of equipment, cable drums, etc.

**№3 Переведите текст**

**Строительные леса.**

Even in ancient Egypt, when there was a need for the construction of multi-storey buildings, required devices with which it was possible to climb the builders to the required height and work there. Therefore, the solution to this issue and was the creation of scaffolding.

The name comes from the word "forest", because the scaffolding was originally made of wooden beams and boards. But wooden forests were unreliable, so with the passage of time and progress, the forests were improved and made of various materials, mainly metals. Improvement of scaffolding has made them more reliable and safe for the life of builders working at height. Today, special rules and regulations have been developed for working on scaffolding.

Metal scaffolding

One of the most reliable and popular types of forests are forests made of metal pipes. As a metal, steel or aluminum is used. There are two types of scaffolding — modular and frame. The varieties of frame include a pin, a lever of the forest and tower tours. And to modular - clamp, wedge, suspended and directly modular or as they are called system forests.

**Раздел14. Группы строительных машин.**

**№1 Переведите диалог**

Builders use different building machines in the process of construction. Bulldozers level the ground. Cranes hoist structural elements and place them into position. Lorries and trailers deliver building materials to the site

Martin: Where do the trucks come from?

Foreman: They come from the cement factory.

Martin: Where is that?

Foreman: It’s about ten miles from here.

Martin: Where do the men and women eat their lunch?

Foreman: They eat where they work.

Martin: What’s that man doing up there?

Foreman: He’s putting up the forms for the cement.

**№2. Переведите текст**

**Transportation of building materials**

For these purposes, both rail and road transport is well suited.

If the distance is large and there is no need for transshipment, the best option is railway transport. If there are no access Railways to the construction site, the best solution is road transport.

The choice of delivery transport also depends on the type of construction material.

Lengthy materials (boards, treated timber, lumber), transport tilt car as wood is hygroscopic, and without a tent it gets wet and deformed. Unprocessed timber is transported in gondola cars. Metal pipes are transported both on trailers and on railway platforms. If the length of the platform is not enough for a long load, it is placed on two adjacent, one after the other.

Brick, as one of the most common building materials, is transported by any transport. Here it is more important not so much transport as packaging or packaging. The brick is laid on the tray, and sometimes even packaged tear-resistant foil packet. So it is easy to transport both horizontally and vertically to the upper floors of buildings, and well laid and Packed brick is not subjected to combat by negligence or negligence.

Transportation of concrete slabs and large concrete products is carried out by trawls, on which special metal trusses are installed. Trusses are easy to mount and dismantle if not necessary. A big plus of such farms is that large-sized cargo is transported by a transport unit not in a single copy, but at least in two.

**Transportation of bulk materials**

Transportation of bulk materials, such as crushed stone, sand, gravel, and produced by rail (at very long distances), and road and water river transport. Open platforms, gondola cars with floor hatches and dump cars are the most suitable for railway transport. The dump cars is car dumper, unloading as in the opening sides, and the rollover of the gondola. From road transport to transport such goods are best suited dump trucks. It is not recommended to unreasonably pour these materials from one transport to another in order to avoid losses. On the rivers bulk materials are transported on barges. This is the cheapest transport, but not everywhere there are waterways.

Hygroscopic bulk materials (cement, alabaster, chalk, etc.) are also transported in paper or plastic bags in covered wagons by rail or under a tent on road transport. Packaging in bags protects them not only from moisture, but also from spilling and spraying. Transport of powdery bulk goods by rail and no sacks, but the hoppers. It covered cars, whose roofs are hatches to load cars ― pneumatic unloading hatches.

Specialized transportation

They are mainly carried out by road. The body of these cars is designed to perform some special transportation. For example, the bodies of cars carrying thermal insulation have increased capacity, which is explained by the ease of cargo.

A number of specialized transport simultaneously with the movement of material involved in the process.. Once the main emphasis was on mixing, so that the mortar and concrete do not freeze in the way. Now these cars are filled with the necessary components and hit the road. It turns out that the solution is prepared during movement, that is, the total time of preparation of the solution and its transportation is reduced. This speeds up the construction time.

Bitumen, emulsion and tar are transported in hot condition by pavers and wheelchairs. Special burners maintain these dense oil products in a heated, therefore, able to flow state. You can use them at any time, that is, again there is a saving of time and money.

**№3 Переведите текст**

**Машины для земляных работ.**

Hydraulic Excavator Heat supply system repair works are being carried out near the 5-storied building. Looking out of the window on the 4th floor one can watch an exca-vator operate. The excavator is like a huge dinosaur stretching a long neck and penetrating into the earth with the teeth mounted on the bucket. The car body of EO4225A excavator is wide giving greater stability when moving. The excavator tilts its head with the bucket and heaps the earth. Then the machine turns its body and boom, dumping the earth into the arrived lorry. To drive the boom and the bucket special hydraulic arrangement is used. We can see 3 hydro cylinders. They drive the boom, bucket and stick. Perfected hydro cylinder piston and rod seals provide their long life. Flexible hoses ensure excellent hydraulic action.

The stick is located between the boom and the bucket. The bucket of universal “transforming” type allows direct-and-backhoe digging. The backhoe is the working equipment for excavating the earth below the station place level with the bucket digging towards the excavator, in contrast to direct digging.

**№ 4. Составьте предложения из следующих слов:**

1. Hydraulic, its, offer, power, new, a, versatility, and, excavator, predecessor, then.

2. Operating, is, 47410lbs, greater, weight, allowing, stability, and, lift, improved, providing, capacity.

3. Used, engine, replace, diesel, Caterpillar, Perkins engine, previously.

4. Speed, engine, while, lower, fuel, noise, reduce, improving, efficiency, level

**№5. Pile driver**

A pile driver is a mechanical device that is used to drive piles into soil to provide foundation support for buildings or other structures. That term is also used in reference to members of the construction crew that work with pile driving rigs. One traditional type of pile driver includes a heavy weight placed between guides so that it is able to freely slide up and down in a single line. It is placed upon a pile. The weight is raised, which may involve the use of hydraulics, steam, diesel, or manual labor. When the weight reaches its highest point it is then released and smashes on to the pile in order to drive it into the ground.

Hydraulic hammer

A hydraulic hammer is a modern type of piling hammer used in place of diesel and air hammers for driving steel pipe, precast concrete, and timber piles. Hydraulic hammers are more environmentally acceptable than the older, less efficient ones as they generate less noise and pollutants. Special equipment which installs piles using hydraulic rams to press them into the ground.

**№6. Переведите текст**

**Safety**

Construction is one of the most dangerous occupations in the world, incurring more occupational fatalities than any other sector in both the United States and in the European Union. In 2009, the fatal occupational injury rate among construction workers in the United States was nearly three times that for all workers. Falls are one of the most common causes of fatal and non-fatal injuries among construction workers. Proper safety equipment such as harnesses and guardrails and procedures such as securing ladders and inspecting scaffolding can curtail the risk of occupational injuries in the construction industry. Other major causes of fatalities in the construction industry include electrocution, transportation accidents, and trench cave-ins.

Other safety risks for workers in construction include hearing loss due to high noise exposure, musculoskeletal injury, chemical exposure, and high levels of stress.

**Раздел 15. Архитектура зданий.**

**№.1 Переведите текст**

1. “We need houses as we need clothes, architecture stimulates fashion. It’s like hunger and thirst — you need them both.”

2. “The mother art is architecture. Without an architecture of our own we have no soul of our own civilization.”

3. “Our reflects truly as a mirror.”

4. «Architecture is the will of an epoch translated into space».

5. «Architecture, of all the arts, is the one which acts the most slowly, but the most surely, on the soul»

**№2. Переведите текст**

**Строительство зданий**

Строительство зданий – это процесс добавления строения к недвижимость или строительство зданий. Подавляющее большинство строительных работ небольшие ремонтные работы, такие как добавление комнаты, или ремонт ванной комнаты. Часто, владелец имущества выступает в качестве рабочего, казначея и проектной команды в течение всего проект. Тем не менее, все строительные проекты строительства включают некоторые общие элементы – дизайн, финансовые, оценки и правовых соображений. Многие проекты различных размеров достигают нежелательных конечных результатов, таких как обрушение строительных конструкций, перерасход средств, и/или судебных споров. По этой причине, лица, имеющие опыт работы в области делают подробные планы и вести тщательный надзор за проектом, чтобы гарантировать положительный результат.

**№3. Переведите текст**

The types of loads acting on structures for buildings and other structures can be broadly classified as vertical loads, horizontal loads and longitudinal loads. The vertical loads consist of dead load, live load and impаct load. The horizontal loads comprises of wind load and earthquake load. The longitudinal loads i.e. attractive and braking forces are considered in special case of design of bridges, gantry girders etc.. Types of Loads on Structures and Buildings In a construction of building two major factors considered are safety and economy. If the loads are adjudged and taken higher then economy is affected. If economy is considered and loads are taken lesser then the safety is compromised. So the estimation of various loads acting is to calculated precisely. Indian standard code IS: 875–1987 and American Standard Code ASCE 7: Minimum Design Loads for Buildings and Other Structures specifies various design loads for buildings and structures.

Types of loads acting on a structure are:

Dead loads

Imposed loads

Wind loads

Snow loads

Earthquake loads

Special loads

**Dead loads**

The first vertical load that is considered is dead load. Dead loads are permanent or stationary loads which are transferred to structure throughout the life span. Dead load is primarily due to self weight of structural members, permanent partition walls, fixed permanent equipments and weight of different materials. It majorly consists of the weight of roofs, beams, walls and column etc. which are otherwise the permanent parts of the building.

The second vertical load that is considered in design of a structure is imposed loads or live loads. Live loads are either movable or moving loads without any acceleration or impact. These loads are assumed to be produced by the intended use or occupancy of the building including weights of movable partitions or furniture etc..Live loads keeps on changing from time to time. These loads are to be suitably assumed by the designer. It is one of the major loads in the design. The minimum values of live loads to be assumed are given in IS 875 (part 2)–1987. It depends upon the intended use of the building.

**Wind loads**

Wind load is primarily horizontal load caused by the movement of air relative to earth. Wind load is required to be considered in structural design especially when the heath of the building exceeds two times the dimensions transverse to the exposed wind surface.

Snow Loads (SL)

Snow loads constitute to the vertical loads in the building. But these types of loads are considered only in the snow fall places. The IS 875 (part 4) – 1987 deals with snow loads on roofs of the building. The minimum snow load on a roof area or any other area above ground which is subjected to snow accumulation is obtained by the expression.

**Earthquake Loads (EL)**

Earthquake forces constitute to both vertical and horizontal forces on the building. The total vibration caused by earthquake may be resolved into three mutually perpendicular directions, usually taken as vertical and two horizontal directions. The movement in vertical direction do not cause forces in superstructure to any significant extent. But the horizontal movement of the building at the time of earthquake is to be considered while designing.

Other Loads and Effects acting on Structures

As per the clause 19.6 of IS 456 – 2000, in addition to above load discussed, account shall be taken of the following forces and effects if they are liable to affect materially the safety and serviceability of the structure

**Раздел 16. Гражданское строительство.**

**№1. Переведите текст**

Civil engineering is a [professional engineering](https://en.wikipedia.org/wiki/Regulation_and_licensure_in_engineering) discipline that deals with the design, construction, and maintenance of the physical and naturally built environment, including public works such as roads, bridges, canals, dams, airports, sewerage systems, pipelines, structural components of buildings, and railways. Civil engineering is traditionally broken into a number of sub-disciplines. It is considered the second-oldest engineering discipline after [military engineering](https://en.wikipedia.org/wiki/Military_engineering),and it is defined to distinguish non-military engineering from military engineering. Civil engineering takes place in the public sector from municipal through to national governments, and in the private sector from individual homeowners through to international companies.

**№2. Переведите текст**

**What is building Construction**

Building construction is a process of adding small or big structures to land or real property. Most of the building construction jobs are small reconstructions like adding bathroom or reconstruction of a room. Often times, the titleholder of the property acts as a designer, paymaster and laborer for the entire job. However, all the building construction jobs include several elements in legal consideration, financial and usual design.

Building constructions are procured publicly or privately using different delivery methodologies such as management contracting, hard bid, construction management at risk, design & build bridging, and negotiated price.

Residential construction technologies, resources and practices should conform to the codes of practice and local building authority regulations. The materials used are widely accessible in the market. The common materials used are timber, stone and brick. The cost of construction is on a “per square foot” basis. This is since homes can vary significantly on local site considerations, conditions, and economies of scale.

**№3. Переведите текст**

Civil buildings are designed to accommodate and meet the domestic, social and cultural needs of people. Civil buildings, in turn, are divided into residential and public. Residential buildings include:1. apartment type houses intended for permanent residence2. hostels – for temporary accommodation of people3. hotels, chalets, dormitories sanatoriums, boarding houses, holiday houses for short stay people4. residential homes – for children living separately from their parents or the disabled and the elderly. For residential buildings characterized by facades with a large number of Windows, balconies, loggias, Bay Windows, ie elements related to the functional solution of the home. The small size of the premises determine the cellular structure of the space – planning solution and a fairly simple design. Each of these types of buildings contains space-planning units corresponding to its purpose. Classification of space-planning solutions of apartment buildings due to the type of residential development: manor, low-rise, high density, high-rise or high-rise. Apartment buildings of medium and high rise form the main urban development.

Public buildings include the following groups of buildings:

1. buildings for education, training and education;

2. buildings for research institutions, design and public organizations and management

3. buildings for health and recreation

4. building for sports

5. buildings of cultural and educational and entertainment facilities

6. buildings for trading enterprises, public catering and consumer services

7. buildings for transport intended for direct service of the population

8. buildings for public utilities

9. multifunctional buildings, including rooms for various purposes.

**№4. Переведите текст**

**Жилищное строительство.**

Переведите фрезы, обращая внимание на термин housing construction.

And the collapse of housing starts has lowered construction spending by another $200 billion.

As such, today's report will provide support for expecting good news in tomorrow's monthly data on residential housing construction.

Everybody counts on Alan Greenspan’s Federal Reserve Board to save the day, and there is little doubt that an interest rate cut would help maintain strength in consumer demand and housing construction.

On a population-adjusted basis, 2014 saw Russia set a post-Soviet record for new housing construction.

Municipalities provide an adequate supply of building sites, are responsible for planning, facilitate housing construction by developing the necessary infrastructure, etc., ensure that housing (and other buildings) are built in accordance with current plans and regulations, and are responsible for providing low-income housing.

In March 2015, China lent Ukraine $15 billion over 15 years, for housing construction to revive Ukraine’s collapsing real estate market.

The decline in housing construction has added to the current shortfall in aggregate demand.

Such efforts, which the central government broadly supports, will enable more housing construction and industrial and commercial expansion.

Last year this effort resulted in stopping the decrease in housing construction and in doubling the number of completed dwellings compared to that of 1995.

But this time, credit expansion is not flowing into housing construction, but rather into commodity speculation and foreign currency.

**№5 Переведите текст**

**Building Construction: Means & Methods**

Building construction is the process of adding structure to real property. The vast majority of building construction projects are small renovations, such as addition of a room, or renovation of a bathroom. Often, the owner of the property acts as laborer, paymaster, and design team for the entire project. However, all building construction projects include some elements in common - design, financial, and legal considerations. Many projects of varying sizes reach undesirable end results, such as structure collapse, cost overruns, and/or litigation. For this reason, those with experience in the field make detailed plans and maintain careful oversight during the project to ensure a positive outcome.

Building construction is procured privately or publicly utilizing various delivery methodologies, including hard bid, negotiated price, traditional, management contracting, construction management-at-risk, design & build and design-build bridging.

Residential construction practices, technologies, and resources must conform to local building authority regulations and codes of practice. Materials readily available in the area generally dictate the construction materials used (e.g. brick versus stone, versus timber). Cost of construction on a per square meter (or per square foot) basis for houses can vary dramatically based on site conditions, local regulations, economies of scale (custom designed homes are always more expensive to build) and the availability of skilled tradespeople. As residential (as well as all other types of construction and manufactured homes) can generate a lot of waste, careful planning again is needed here.

The most popular method of residential construction in the United States is wood framed construction. As efficiency codes have come into effect in recent years, new construction technologies and methods have emerged. University Construction Management departments are on the cutting edge of the newest methods of construction intended to improve efficiency, performance and reduce construction waste.

**Раздел17. Промышленное строительство.**

**№1. Переведите текст**

**Industrial Construction**

When you think of industrial construction, don't think about my [driveway](https://home.howstuffworks.com/home-improvement/repair/how-to-blacktop-asphalt-driveway.htm), or my [roof](https://home.howstuffworks.com/home-improvement/construction/materials/roofing-materials.htm) or even the [building of a new house](https://home.howstuffworks.com/home-improvement/construction/planning/how-long-should-building-house-take.htm) up the road. Think big. Think massive. Think industrial-size like the big cans of tomato juice at Costco. Those in the industrial construction business design, install and maintain titanic structures including power plants, skyscrapers, warehouses, factories and other larger-than-life projects . The work can be as varied as working on a [bridge](https://science.howstuffworks.com/engineering/civil/bridge.htm), a dam or an [oil refinery](https://science.howstuffworks.com/environmental/energy/oil-refining.htm). Industrial construction is a specific form of building that requires expert training and highly experienced workers who can multi-task. Many industrial construction companies are large, multi-national firms. Projects are run by a bevy of managers, engineers and architects. To get a better handle on what this industry's workers do, let's take a trip to the world's largest industrial construction project, the Jubal Industrial City in Saudi Arabia. Located in the eastern part of the country, the Jubal project began in 1975 as the Saudis sought to expand their petrochemical industry

**№2. Переведите текст**

The manufacturing industry is the source of many products, where raw materials undergo the process of becoming a finished item or product that can be used for a specific purpose. In order to manufacture these goods, specialized equipment and machinery is often needed, and therefore large buildings to house everything in the process are required. These industrial buildings are the starting block for many products and commodities that we use.

Brewery

A brewery is a building dedicated to making beer. Although beer can be made at home, breweries are large industrial buildings with greater resources than the average person. Their use of specialized techniques and machinery enables breweries to produce enormous amounts of beer. There are various stages to brewing beer, from the process of mixing the grains with water through fermenting, conditioning and filtering. Although much of this is performed by automated machinery, brewery workers are required to monitor computers and temperatures of water and liquids used in the process. Once the process is completed, beer is poured into containers that eventually will be delivered to bars, clubs and shops around the world.

Foundry

A foundry is a factory that produces metal castings. The castings are made from molten metal according to a client’s specifications. This is done using a furnace to melt the metals and then pouring them into molds. Wood, wax or sand is used to make patterns in the shape of the desired part. Once the metal is solidified, it is removed from the mold and goes through a finishing process of grinding and sanding to achieve the desired look. Castings are widely used around the world in the automotive industry as well as for ships and airlines and in household goods such as refrigerators and freezers.

Oil Rig

Also known as an offshore platform, an oil rig is a large, mechanical structure with facilities to drill wells and extract oil and natural gas from beneath the ocean floor. These products can be processed on the rig before being sent back to shore.There are various types of offshore oil rigs, which may be fixed to the ocean floor or suspended on very strong cables, capable of resisting huge lateral forces. Other types of rigs float on the surface or are semi-submerged in the water.

**Power plant**

Power plants or power stations are huge industrial facilities that burn fossil fuels such as coal, gas or oil and convert it into electrical energy. At the heart of every power station is a huge generator that extracts energy from the fuel. Nuclear power stations split atoms, usually of uranium, to produce energy. The heat produced from the fuel is used to turn water into steam, which in turn powers a turbine that is connected to the generator. This process goes through several stages before the electricity is generated. Transformers boost the electricity to extremely high voltage as it leaves the plant and huge pylons carry the electricity to wherever it is needed.

Commercial

Commercial buildings, generally, are buildings used by businesses to sell their products to consumers.

**№3. Переведите текст**

**Construction of industrial buildings**

The construction of industrial buildings using modern technologies with the use of innovative materials and equipment can be made in a short time. If the construction company has its own production of building materials, then there is a real opportunity to reduce the final cost of the building. Industrial buildings are understood as buildings for installation in the production lines of the most diverse spheres of the economy. This area can also be attributed to the construction of administrative buildings . A qualitatively constructed industrial structure will ensure the labor process in accordance with the requirements of specific production and standards for labor protection, efficient operation of process equipment. As civil buildings in housing construction must have a kitchen, a hallway, stairwells and an elevator, so the industrial facilities include their "gentleman's set" of distinctive features. Most often it is:

Significant sizes of buildings;

Decent extent of the facade;

Deaf walls of solid construction;

Ribbon glazing;

Fences in the form of sandwich panels or steel sheets (with different profiles);

Technical equipment and accessories (conveyors, pipelines;

Augers;

Ventilation and chimneys;

Auxiliary industrial buildings outside the main building.

Sometimes the construction of an industrial structure involves the erection of a hangar.

**Раздел 18. Строительный бизнес**

**№1. Переведите текст**

The construction business is one of the most profitable in Russia. It is not the first year that the so-called "construction boom" lasts and it will last for more than a decade.

Not only residential buildings are being built, but also municipal buildings, factories, shopping centers.

Even a young company can win a tender for the construction of an object and earn a lot of money.

About how to participate in tenders, you can read here . Architectural and design firm .

Development of construction business in Russiа

Construction is a separate independent area of the country's economy, which is intended for the introduction of new actions, as well as reconstruction, expansion and technical re-equipment of existing production and non-production facilities. The determining role in the industry is to create conditions for the dynamic development of the country's economy.

Construction has a number of features that distinguish it from other industries.

Construction business in Russia

The construction business continues to develop every day.

People consider it profitable, so many are attracted by the prospect of doing construction. For a businessman – this is a huge field of activity.

**№2. Переведите текст**

**Строительный бизнес в Великобритании.**

Есть ли какие-то особенности местного строительного рынка, которые не учитывают клиенты при проектировании будущего дома? Да, такие особенности есть. Проектируя дом в Великобритании, важно понимать, что эта страна славится своим консерватизмом и приверженностью традициям, а потому возможны некоторые ограничения, которые нужно учитывать при разработке проекта. Например, в одном из наиболее популярных среди инвесторов закрытом комплексе частных резиденций Wentworth Estate, новый дом не должен занимать более 20% участка и не может превышать размеры старого дома более чем на 30% (над землей). Кроме этого всегда существуют ограничения по виду фасадов, высотам и т.д.Дом, как правило, должен располагаться на месте старой постройки и не может загораживать определенные углы обзора соседям, если таковые имеются. Регламентируется использование строительных материалов. Нельзя построить ультрасовременное здание из стекла и бетона среди особняков викторианской эпохи и тем самым нарушить сложившийся веками единый стиль и архитектурный ансамбль. Проект может получить отказ в строительстве с пометками: «слишком не английский» или «слишком вычурный», «слишком современный».

**№3. Переведите текст**

**Строительный бизнес в США.**

**Зарплаты**

Зарплаты в стройке в США варьируются от 12 USD/час для подсобников до 93 USD/час Идёт много проектов для правительства, для армии, где минимальная оплата труда, скажем, электрика, равняется 62 долларам в час. Все рабочие, естественно, хотят попасть на такую стройку. Но есть и много частных проектов, например Tesla Gigafactory, где из-за бешеного темпа работ установлен стандартный режим работы 6 дней в неделю, 10 часов в день. Но это на частной стройке, на которой график очень сжат и людей сильно не хватает. На обычной стройке квалифицированный персонал получает 40 USD x 40 часов в неделю. Чтобы добраться до такой оплаты труда, нужно быть хорошим рабочим, умелым. Которого ценят коллеги и начальство. Есть ещё стройки типа Prevailing Wage и Davis-Bacon Act.На стройках Prevailing Wage и Davis-Bacon Act все зарплаты в час для каждого вида рабочей профессии установлены правительством США, и обновляются раз в год.

Все Public Works (дороги, мосты, инженерные сети для городов, школы, здания правительства, станции генерации, перекачки воды и канализации, военная инфраструктура и т.п.) являются проектами с контролируемой оплатой труда рабочим. Поэтому они, как правило, намного дороже, чем частные проекты. Один из примеров - реконструкция здания ООН в Нью-Йорке, этот проект стоил более 2,5 млрд. долларов. И львиная доля этих расходов пришлась на оплату рабочей силы.

На строительном рынке США сейчас очень высока потребность в рабочей силе. Компании не могут найти себе людей на проекты, люди просто кончились, идёт строительный бум. Поэтому механизмы мотивации, отношения к сотрудникам, их обучения для повышения их отдачи - всему этому уделяется особое внимание.

**№4. Переведите текст**

**Как начать строительный бизнес.**

How to start a construction business from scratch: a plan, step-by-step instructions and recommendations

1. Monitoring of the market
2. Registration of activities
3. How to start a construction business from scratch: a plan
4. With a unique and easily recognizable name.
5. From the location of the company's office in a place accessible to customers.
6. From the authorized capital invested by the founders or from the starting capital, without which the firm can not begin its stable functioning.
7. With the collection of documents required for registration of the company - passport of each founder, information on location, main type of activity, as well as the size of the authorized capital and the way of its formation.
8. All these actions can be performed independently or ask the appropriate specialists for help.

**Professionalism and organizational skills. What is more important?**

The Brigade

Colleagues

The financial part

Permit documentation

What does a construction company do?

Required staff

Where to search for orders?

**№5. Переведите текст**

**Construction machinery; rent**

About company: Founded in 1994, Magnetiks is the official representative of the mobile crane Spierings in Latvia. The company offers rental of lifting equipment. Customers are also offered construction machinery. The company's specialists will offer assistance in removal of consequences of an accident with crane, clean the roofs of snow and icicles, and help you to load and unload cargo even in tight conditions and at high altitudes.

***Equipment for rent*:** For customers to be able to verify the suitability of the equipment we offer for the work to be carried out, we can offer long-term lease or lease-purchase for individual career equipment units (mobile crushers, screeners). We can also agree on long-term lease (without operator) or leaseback for other equipment (excavators, loaders). The terms and conditions of the agreement are negotiated with each buyer individually.

**№6. Переведите текст**

**Условия хранения строительных материалов и оборудования.**

1. База должна иметь технологические планировки размещения оборудования и материалов.

2. На каждом складе должны быть:

схема размещения и правила хранения материалов; должностные инструкции; образцы документации оперативного учета, а также правила установленного внутреннего распорядка работы.

3. На всех товарно-материальных ценностях на складах должны быть бирки с указанием наименования, марки, количества, цены, номера карточки и даты поступления.

4. Способы укладки материалов и изделий (в штабелях, на стеллажах или напольно) зависят от их формы, веса, упаковки, физических свойств и количества.

5. Материалы и изделия, пакетированные на плоских и в ящичных поддонах, можно хранить на полочных стеллажах.

6. Мелкоштучные изделия неправильной формы и без упаковки можно хранить в полочно-клеточных стеллажах с укладкой в ящичные поддоны и без них.

7. Пакетированию на плоских поддонах подлежат грузы, находящиеся в жесткой таре, и штучные изделия, конфигурация которых позволяет создать устойчивый пакет.

8. На каждом складе должны быть:

схема размещения и правила хранения материалов; должностные инструкции; образцы документации оперативного учета, а также правила установленного внутреннего распорядка работы. Развернутые схемы размещения стеллажей с их маркировкой необходимо вывешивать на видном месте.

9. На всех товарно-материальных ценностях на складах должны быть бирки с указанием наименования, марки, количества, цены, номера карточки и даты поступления.

10. Работники склада должны уметь работать с противопожарным инвентарем и оборудованием, знать правила ухода и применения его при тушении.

**№7. Переведите текст**

**Набор рабочего персонала.**

The Brigade

How to start a business from scratch in the construction industry? We need to find bona fide skilled workers. This profession is recognized as the most necessary in the world.

A large enterprise with a personnel reserve, can apply to an unscrupulous employee any measures up to and including dismissal, without fear of doing so. But a small company, left without a specialist, can lose an order due to the failure of terms.

Therefore, if an efficient team was not collected at the beginning of the activity, then it is not worthwhile to start work.

By the way, it is necessary to complete the basis of the collective only from qualified employees, and then to get newcomers as the firm expands.

In the modern market economy, everything needs to be done quickly and efficiently. That is, yesterday a hired specialist should immediately begin to implement the plan.

Toughening staff requirements is observed in view of the fact that the construction is not only responsible, but also a long process. After all, the appearance of cracks or sloshing, not to mention the collapse - this is not an ordinary breakdown of household appliances.

Colleagues

How to start a repair business? Any competitive environment involves professional interaction - binding to the master plan, reconciling the project, connecting communications, etc. Therefore, it is necessary to notify colleagues in advance of the planned actions, the niche found for them, the sequence of work performance.

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**№4. Переведите текст**

**Подбор строительного персонала**

Подбором строительного персонала должен заниматься рекрутер с аналогичным опытом. Это также отразится на сроках закрытия вакансии. Если же на предприятии нет штатного рекрутера, то стоит поискать агентства, оказывающие услуги по подбору персонала для строительной отрасли. Они с полуслова поймут, какой специалист Вам нужен, т.к. уже имели аналогичный опыт подбора в отличие от тех агентств, которые не специализируются на подборе персонала для строительной отрасли. Подбору строительного персонала предшествует Ваш звонок в агентство, где Вы озвучиваете, например: «нам нужен сварщик на полуавтомат, арматурщик, каменщик и инженер-строитель 1 категории».

**№ 5. Переведите текст**

**Logistics management in the construction industry**

Many construction projects currently face complex and different situations that slow or hinder the process of achieving project success. These problems also have the tendency to impact the projects and negatively influence the successful achievement of projects' goals. One of these effects can be productivity loss, resulting from poor logistics management practices. It has been proven that logistics management has direct and indirect relations to productivity loss. This paper, therefore, examines inadequate logistics management in the construction industry and presents the evidence of its impact. In order to obtain accurate and appropriate data, a framework that consisted of qualitative and quantitative methods was followed. Literature, historic documents, direct observations, interviews and a questionnaire were the instruments that were used to collect data. Adoption of these methods ensured that the current construction logistics situations were properly obtained presented. This paper presents many results that indicate the inadequacy of logistics management practices in construction, including long truck cycle times, late and unscheduled material deliveries, frequent interruptions of equipment schedules, misinformed labor, and the absence of contemporary technologies. This paper provides evidence of the poor logistics management in construction industry. Many construction projects currently face complex and different situations that slow or hinder the process of achieving project success. These problems also have the tendency to impact the projects and negatively influence the successful achievement of projects' goals. One of these effects can be productivity loss, resulting from poor logistics management practices. It has been proven that logistics management has direct and indirect relations to productivity loss. In order to obtain accurate and appropriate data, a framework that consisted of qualitative and quantitative methods was followed. Literature, historic documents, direct observations, interviews and a questionnaire were the instruments that were used to collect data. Adoption of these methods ensured that the current construction logistics situations were properly obtained presented. This paper presents many results that indicate the inadequacy of logistics management practices in construction, including long truck cycle times, late and unscheduled material deliveries, frequent interruptions of equipment schedules, misinformed labor, and the absence of contemporary technologies. This paper provides evidence of the poor logistics management in construction industry.

**Перечень рекомендуемых учебных изданий**

**Для студентов:**

**Перечень учебных изданий**

1. Безкоровайная Г. Т., Койранская Е. А., Соколова Н. И., Лаврик Г. В. Planet of English: учебник английского языка для учреждений СПО. — М., 2017.- 257с.
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**Для преподавателей:**

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**Интернет ресурсы**

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2. www.channel4learning.com/