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Кафедра иностранных языков для технических направлений

# Английский язык

# CONSTRUCTION MATERIALS

Методические указания по развитию навыков чтения
и технического перевода для студентов архитектурного направления

Факультет инженерно-строительный

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**Английский язык. Строительные материалы:** методические указания по развитию навыков чтения и технического перевода для студентов архитектурного направления.- Вологда: ВоГУ, 2015. – 27 с.

Методические указания содержат сведения по строительным материалам и их использованию в процессе исторического развития и до настоящего времени. Методические указания состоят из 7 уроков с учебными текстами и упражнениями, направленными на развитие навыков технического перевода по специальности и накоплению лексики по указанной тематике.

Методические указания предназначены для студентов вузов, изучающих английский язык, и лиц, занимающихся английским языком самостоятельно и интересующихся данными вопросами.

Утверждено редакционно-издательским советом ВоГУ

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# Unit 1

**Wood/** By Steven Puetzer

## 1. Translate:

ice age, makesift shelters, animal skins, long-lasting dwellings, ongoing quest, mud huts, ever-versatile building material, construction material, log cabin construction, support structure, moisture damage, wood buildings,

## 2. Find antonyms in the right column to the words in the left column:

| | |
|---|---|
| disadvantages | to leave |
| to start | quickly |
| slowly | advantages |
| to create | to end |
| changing | to break |
| to find | constant |
| should | little |
| much | to stop |
| to stay | to miss |
| to come | must |

## 3. Find synonyms in the right column to the words in the left column:

| | |
|---|---|
| fundamental | to finish |
| beginning | to end |
| plentiful, | to learn |
| evolution | Basic |
| structure | start |
| leap | rich |
| to stop | growth |
| to find | building |
| many | jump |
| much | abundant |
| | a lot of |

## 4. Read and translate the text. Consult the words below if necessary:

Wood can survive a long time, although it does have some disadvantages.

Around 10,000 years ago, man started to make fundamental changes in the way he lived. Slowly moving away from a nomadic lifestyle, he started staying in one place for longer periods. This was probably due to the ending of the last ice age creating more abundant resources. Man didn't have to travel as far to find food, so he stayed where food was plentiful. Over time, a more

settled lifestyle brought some challenges with it. Instead of having to find caves or create makesift shelters from animal skins for protection from the weather, man started to look for more durable materials with which to build long-lasting dwellings [source: Castleden].

Over time, man has used a variety of materials, and they help to paint a picture of our ongoing quest to make long-lasting structures to meet our changing needs. The evolution of architecture meets those challenges and handles the cultural perception of what those buildings should look like and how they should be used.

Let's take a look at five materials that man has relied on to build homes, halls, temples and many other types of structures. All five are still used today, and knowing something about them will help us make the historic leap from mud huts and tents to skyscrapers that can shelter thousands.

First up, lets take a look at the ever-versatile building material of man and termites alike: wood. As a construction material, wood has a lot going for it. It can be used as a primary material, as seen in log cabin construction or blended with other building materials and used as either a decorative element or support structure. Wood is lightweight compared to stone, and it's strong once it's been seasoned to remove moisture. It can also be cut to length easily.

Wood does have some disadvantages, though. It decays eventually, and it's vulnerable to moisture damage like dry rot and predation by insects like termites. Fire is a big problem, too.

Even with these vulnerabilities, wood buildings can survive a long time. Just how long may surprise you. The oldest wood building in existence is the Horyu-ji temple in Japan, which dates to the 8th century [source: CWC].

**5. Answer the questions:**

1. What are advantages of wood?
2. What are disadvantages of wood?
3. Do you like wood buildings or brick buildings? Why?
4. What buildings are popular now?
5. What house would you like to have for your family  better: made of wood or made of brick?
6. What new facts did you find in the unit?
7. Was it interesting to read?
8. Will the information be useful in your future activity?

**6.  Words to the text:**

survive [sə'vaɪv] - a) пережить (по времени)  b) выдержать

due to ['dju] - благодаря; вследствие; в результате; из-за

abundant ( syn. plentiful) [ə'bʌndənt] - обильный, богатый, изобилующий

durable ['djuərəbl] - a) надёжный, прочный, стойкий, крепкий
b) долговременный, долговечный

meet smth [mi:t] - a) встречать б) встречаться, видеться в) соприкасаться,

handle ['hændl] - a) управлять (чем-л.) , справляться (с чем-л.)

perception [pə'sepʃ(ə)n] - a) восприятие, ощущение b) осмысление, осознание, понимание

vulnerable ['vʌln(ə)rəbl]- уязвимый; ранимый

vulnerability [ˌvʌln(ə)rə'bɪlətɪ] - a) уязвимость; ранимость
b) (vulnerabilities) слабые места в системе защиты

predation [prɪ'deɪʃ(ə)n] – истребление

countdown ['kauntdaun] – обратный отсчет

**7. Write a commercial advertisement on selling of a private house made of wood.**

**8. Translate into English:**

С незапамятных времен люди используют дерево для строительства. Из него возводились храмы и ветряные мельницы, мосты и крепости и, конечно же, дома. Незаменим для строительства теплого и экологически чистого дома этот материал благодаря своим удивительным свойствам: прочности, способности сохранять тепло и великолепно обрабатываться. Кроме того, он великолепно смотрится, источает неповторимый природный аромат и создает такой уровень комфортности, который отвечает всем санитарно-гигиеническим требованиям.

Деревянный дом прекрасно подходит для регионов с различным климатом - в нем прохладно летом и тепло зимой, к тому же он "дышит". Сегодня строительство деревянных домов переживает свое возрождение. За последние несколько лет количество деревянных построек для жилья увеличилось на 19-15%, а стоимость 1 куб. м. древесины возросла вдвое. Не будь такое строительство столь дорогим, деревянные дома были бы явлением более частым. И, тем не менее, перефразируя Владимира Высоцкого, можно сказать, что лучше деревянного дома может быть только другой деревянный дом. Пусть он отличается конструкцией, размерами, декором, но обязательно будет из дерева. Этот природный материал как никакой другой позволяет воплотить множество архитектурных замыслов. В дополнение к вышеперечисленным

свойствам можно добавить, что дерево прочно, морозостойко, имеет низкую звуко- и теплопроводность в сочетании с достаточной теплоемкостью, хорошо обрабатывается и монтируется - чтобы получить крепкое соединение стоит лишь вкрутить шуруп или вбить гвоздь. И главное - из дерева можно строить круглый год. Примечательно, что в последние годы жить в Европе в деревянном доме - это признак престижности. *(www.homeburg.ru/**derevo**-v-stroitelstve.html*
*по материалам публикаций каталогов "Дом.ua" и "Украинского строительного каталога" (Украина, Киев)*

## Unit 2. Brick

**1. Explain the meaning of each word in English:**
Structure, Roman, aqueduct, the Pantheon, Sumerian, construction, block, deposite, experimentation, uniform, application.

**2Give derivatives of the following words, translate them**:
To experiment – experimenting -
To build – building –
To make – making –
To construct – constructing –
To develop – developing –
To deduce – deducing –
To deposite – depositing –
To structure – structuring –
To create – creating –
To work – working –

**2. Read and translate the text. Consult the words below if necessary:**

Brick is an incredibly sturdy material to build with. In the text, let's see how playing with mud can be a smart thing to do when you're trying to make bricks.

Usually made of clay, brick has been used in many ancient structures, like the Roman aqueducts, the Pantheon and the Great Wall of China. The Sumerians made the earliest recorded bricks, and we can deduce that those early bricks used in construction were crude, uneven, sun-dried blocks probably made of silt that was deposited when high waters receded after floodings [source: Britannica].

The silt dried naturally to a very hard consistency, and then it was dug up, broken into chunks and used to make the walls of huts and other structures. Some experimentation led to the development of forms and molds to create

uniform bricks that could be stacked easily for smooth walls with clean corners.

This style of brickmaking is still being used today and is very stable in dry climates. But too much rain and the walls of your painstakingly built hut turn to mud. That's solved with the application of high heat. These bricks are durable, weather resistant, fire resistant, easy to make and convenient to work with.

**3. Answer the questions:**

1. What is brick?
2. Where and when did the first bricks appear?
3. What were the first briks made of?
4. Where were they used?
5. What is the meaning of bricks now?
6. What new facts did you find in the unit?
7. Was it interesting to read?
8. Will the information be useful in your future activity?

**Words to the text:**

Pantheon ['pænθɪən] - 1) а) (Pantheon) Пантеон, "храм всех богов" в Древнем Риме б) пантеон (античный храм, посвящённый всем богам) 2) пантеон богов, совокупность богов какого-л. культа 3) пантеон, усыпальница выдающихся людей.

Aqueduct ['ækwɪdʌkt] - акведук, водопровод

sturdy ['stɜ:dɪ] - прочный, крепкий

Sumerian [su:'mɪərɪən] - 1) шумер, шумерка (представитель древнего народа, населявшего Южное Двуречье (территория современного Ирака))

deduce [dɪ'dju:s] - приходить к заключению, делать вывод;

silt [sɪlt] - ил, наносы, осадок; наносы ила

recede [rɪ'si:d] - отступать, пятиться; удаляться, ретироваться

consistency [kən'sɪst(ə)n(t)sɪ] - 1) логичность, последовательность, связность 2) стойкость, устойчивость; прочность, постоянство

chunk [ʧʌŋk] - глыба (угля, руды и т.д.)

stack [stæk] - 1) штабель; кипа; стопка;

stack up - складывать в штабель, стопку или столбик

**4. Find English equavalents to the following words and word combinations in the above text and use them in your own sentences:** самое необходимое; жидкая грязь; древние сооружения; впервые упомянутый в истории; необожженный; сохраниться; естественным путем; хижина; стандартный; ровные стены; обычно (традиционно); старательно; устойчивый к воздействию погоды; огнеупорный; все, что вы хотели узнать о кирпиче; высокая температура.

**5. Translate into English:**

***История кирпича***

Слово «кирпич» заимствовано из тюркских языков. До кирпича использовалась *плинфа* (например, при посещении Иваном Грозным недостроенного Софийского собора в Вологде на него упала *плинфа*: «как из своду туповатова упадала *плинфа* красная»). «Плинфа» — тонкая и широкая глиняная пластина, толщиной примерно 2,5 см (30 х 35 х 2-3 см). Она изготавливалась в специальных деревянных формах. Плинфа сушилась 10—14 дней, затем её обжигали в печи. На многих плинфах находят клейма, которые считаются клеймами изготовителя. Хотя вплоть до нашего времени широчайшее распространение имел во многих странах необожжённый кирпич-сырец, часто с добавлением в глину резаной соломы, применение в строительстве обожжённого кирпича также восходит к глубокой древности (постройки в Египте, 3—2 тысячелетие до н. э.). Особенно важную роль играл кирпич в зодчестве Месопотамии и Древнего Рима и Византии, где из кирпича (45×30×10 см) выкладывали сложные конструкции, в том числе арки, своды и т. п. Форма кирпичей в Древнем Риме варьировалась, использовались в том числе прямоугольные, треугольные и круглые в плане кирпичи, прямоугольные плиты кирпича радиально разрезали на 6-8 частей, что позволяло из получившихся треугольных кусков класть более прочную и фигурную кладку.

Стандартный обожжённый кирпич использовался на Руси с конца XV века. Ярким примером стало строительство стен и храмов Московского Кремля во времена Иоанна III, которым заведовали итальянские мастера. «*... и кирпичную печь устроили за Андрониковым монастырем, в Калитникове*. Привычный же нам кирпич прямоугольной формы (его удобней было держать в руке) появился в Англии в XVI веке. (*ru.wikipedia.org/wiki/**Кирпич)***

# Unit 3. Stone

**1. Translate correctly:**
tension and stress limitations, interior environments, tent flaps, , Stone Age settlers, building material, stone structures, building construction, stone veneers, stone edifices, human design.

**2. Underline the root-word, translate it into Russian and then translate its derivative, paying attention to the meaning of affixes:**
Durable, impressive, tension, limitations, available, extremely, useful, unlike, deforming, extraordinary, construction, decoration, historical, inexpensive, decorative, settlers.

**3. Read and translate the text. Consult the words below if necessary:**
… let's take a look at a building material for the ages, stone.

Stone is durable and impressive stuff, but it's also challenging to quarry, and heavy to move, and it has tension and stress limitations. Where there are resources available to excavate and cut it precisely, stone can be an extremely strong and useful natural material. Unlike brick, it can be stacked without mortar and support heavy vertical loads. Stone resists deforming, weathers the elements well, withstands fire and helps maintain stable interior environments. There are so many extraordinary stone structures that it seems a shame that modern construction uses stone more as decoration than anything else.

Today, there are cheaper and more efficient building materials that have usurped the position of stone in modern building construction, not the least of which are decorative stone veneers. It seems humbling, but steel, wood and concrete construction with a thin layer of decorative stone on the outside is more in keeping with modern budgets and standards of construction than the impressive, towering stone edifices of historical buildings. Newer synthetic materials are even mimicking the look of stone in much lighter weight, inexpensive incarnations, eliminating the need even for veneers.

Stone is still popular for its esthetic value, and it's unlikely that it will ever be completely eliminated. Stone has probably been around since the first Stone Age settlers reached for a few rocks to hold down their tent flaps, and as a decorative element in human design, it's bound to be a part of our structures for a long time.

**4. Answer the questions:**
1. What is stone?
2. What characteristics does stone have?
3. What is stone used for?
4. When will you use newer synthetic materials?
5. What is the future of stone you think?

**5. Words to the text:**

quarry ['kwɔrɪ] - 1) каменоломня, открытая разработка, карьер 2) разрабатывать карьер, добывать (камень из карьера)

mortar ['mɔ:tə] - 1) ступа, ступка 2) толочь в ступе 3) известковый раствор; строительный раствор 4). скреплять известковым раствором

usurp [ju:'zɜ:p] - узурпировать, незаконно захватывать veneer

[və'nɪə] - (кирпичная) облицовка; наружный слой; защитное покрытие (кирпичная) облицовка;

edifice ['edɪfɪs] - большой дом, величественное здание, строение (о храме, дворце, замке)

mimic ['mɪmɪk] - 1) а) подражательный; 2) поддельный, искусственный

flap [flæp] - откидное полотнище

hold down - удерживать

be bound – быть обязанным,
be around = be about – быть обязанным

**6. Find English equavalents to the following words and word combinations in the above text and use them in your own sentences:**
каменные сооружения, вечный строительный материал, очень прочный, декорационный, стандарты в строительстве, противостоять, быть популярным, в соответствии с, быть обязанным, эстетическая ценность.

**7. Find synonyms in the right column to the words in the left column:**

| | |
|---|---|
| challenging | stuff |
| position | dig |
| heavy | place |
| efficient | rock |
| material | veneer |
| mimic | artificial |
| building | structure |
| stone | weighty |
| excavate | difficult |
| Facing | skilful |

**8. Say whether these statesments are true or false. Give correct answers (It's right…, right you are…; No it's wrong…, you are mistaken…:**

1. Stone is not the only building material for ages.
2. Stone has a lot of negative qualities. What are they?
3. People can hardly find ancient stones nowadays.
4. Stone is not as widely used in 2I century as it was earlier.
5. Now stone is the worst and the cheapest building material.
6. New synthetic materials cannot mimic the look of stone.
7. Synthetic materials were found in Stone Age.
8. Neither of natural materials are used in construction.
9. Now stone cannot be a part of our structures.
10. In future stone won't be used in construction at all.

**9. Translate into English:**

ПРИРОДНЫЙ КАМЕНЬ - ВЕЧНЫЙ МАТЕРИАЛ

Природный камень – это, пожалуй, единственный строительный материал который может называться вечным, по праву считается символом прочности и надежности. Камень – это износоустойчивость, прочность, стойкость к перепадам температуры и влажности плюс уникальные эстетические качества: богатая цветовая гамма, рисунок прожилок, различная фактура. Вспомните великие творения цивилизации, дошедшие через века до наших дней: пирамиды, античные скульптуры, романские и готические храмы, дворцы. Но времена, когда лишь фараоны и императоры могли позволить себе такую роскошь, как использование в постройках натурального камня, прошли. Новые индустриальные методы обработки расширили возможность применения камня как отделочного материала, позволили существенно снизить себестоимость. Сегодня из предмета роскоши камень становится товаром повседневного спроса.

Использование природного камня в отделке фасадов, интерьеров, в архитектуре малых форм (фонтаны, беседки и т.п.) делает многие здания и площади стильными, уютными, оригинальными. Респектабельность внешнему виду и внутренним интерьерам придает именно отделка природным камнем. Умелое сочетание различных фактур и цветовых переходов позволяет максимально раскрыть неповторимую красоту используемых материалов. (www.mir-kamnya.ru/article_9.html)

**1. What new facts did you find in the text?**
**2. Is the information useful?**

# Unit 4. Reinforced concrete

**1. Translate:**
concrete medium, building choice, twentieth century refinements, building design and construction, water repelling characteristics, concrete's tensile strength and resistance, support framework, steel technology, building challenges.

**2. . Underline the root-word, translate it into Russian and then translate its derivative, paying attention to the meaning of affixes:**
Mixture, flexible, hardened, transported, acceptance, acceptance, rebar, reinforcement, relatively, economical, refinements, characteristics, resistance, prefabricated.

**3. Read and translate the text. Consult the words below if necessary:**

**Reinforced concrete is everywhere in construction./** By Alistair Berg

Concrete is an aggregate made up of a number of materials like stones and sand that are mixed with a binder like cement and water. The mixture is then left to dry and harden. It's a flexible material that can be formed on the spot or poured into molds, hardened and then transported.

Even though it had been around for hundreds of years, it wasn't until 1860, when someone realized that concrete could be reinforced to increase its **tensile strength** (the amount of force or stress it could withstand), that concrete started gaining wide acceptance.

Reinforced concrete can be formed into many shapes with a supporting structure of narrow steel rods embedded right in the concrete when it's poured. **Rebar** reinforcement makes concrete an ideal material for walls, beams, slabs, foundations, frames and many other applications. The use of metal rods and mesh, together with a relatively inexpensive concrete medium, makes reinforced concrete a flexible, reliable and economical building choice.

Twentieth century refinements have made reinforced concrete an even bigger player in modern building design and construction. **Pre-cast** concrete is made under controlled manufacturing conditions that increase its water repelling characteristics and limit its capacity to expand and contract. **Pre-stressed** concrete, made by placing stretched steel strands in the hardening concrete, increases reinforced concrete's tensile strength and resistance to downward pressure.

Let's take a look at how steel is being used to do more than just reinforced concrete in building construction.

Once man started building up instead of out, stronger building materials became necessary to support taller structures. And tall buildings place a lot of weight on load-bearing walls; some sort of support framework was needed to carry the load.

We can see here that steel has a dual role in our builder's toolkit. It can be embedded in concrete to provide support or become a foundation in itself. Steel can easily be prefabricated to make for a fast and easy installation. It can be welded, bolted or riveted in place. It can be up to 100 percent recyclable, too, which is important with newer green building practices. Steel is a relatively economical commercial building choice which is making inroads in residential construction, as well.

The advent of steel technology that allows man to design and build taller structures has changed the face of architecture and expanded the way we find creative solutions to our building challenges.

**4. Answer the questions:**

1. What is cement?
2. When did people start to use cement?
3. What qualities of cement did people like?
4. What is reinforced concrete?
5. For what is reinforced concrete popular?
6. What are the qualities of precast concrete?
7. What material is also discussed in the rext?
8. What is its role in construction?
9. What new facts did you find in the unit?
10. Was it interesting to read?

**5. Words to the text:**

Reinforced concrete [ˌriːɪn'fɔːst 'kɔnkriː t] - железобетон

aggregate ['ægrɪgət] - множество, совокупность, скопление

binder ['baɪndə] - связующее вещество (клей, цемент)

spot [spɔt] - место, местность; небольшой участок местности

mold = mould [məʊld] - литейная форма; пресс-форма; || отливать в форму; формовать

be around 1) = be about 2) быть популярным, известным

rivet ['rɪvɪt - a) заклёпывать, клепать, скреплять заклёпками

reinforce [ˌriːɪn'fɔːs] - a) укреплять, усиливать b) армировать (бетон)

tensile strength - предел прочности на разрыв/растяжение

withstand [wɪð'stænd] - устоять (перед чем-л.) , выдержать (что-л.); противостоять, не поддаваться (чему-л.)

gain [geɪn] - добывать, зарабатывать

Rebar – арматурный стержень, арматурная сталь

Mesh [meʃ] - петля, ячейка сети; отверстие, зацепление

refinement [rɪ'faɪnmənt] - очищение, очистка (от примесей)

Pre-cast concrete - сборный бетон; сборный железобетон
Prestressed concrete – предварительно напряженный бетон
facebook.com/pages/Start-the-Countdown 137869029539

**Translate correctly:**
Be made up – is made up; be mixed with – are mixed with; be used – is being used; can be formed; could be reinforced; can be embedded;
Can be welded; can be bolted; can be riveted.

**2.Find irregular verbs in the text and write their three forms.**

**Translate into English:**
**Железобето́н** — строительный композиционный материал, состоящий из бетона и стали. Запатентован в 1867 году Жозефом Монье как материал для изготовления кадок для растений.

## История

В 1802 г. при строительстве Царскосельского дворца российские зодчие использовали металлические стержни для армирования перекрытия, выполненного из известкового бетона. В 1829 г. английский инженер Фокс реализовал армированное металлом бетонное перекрытие. В 1849 г. во Франции Ламбо построил лодку из армоцемента. В 1854 г. Уилкинсон в Англии получил патент на огнестойкое железобетонное перекрытие. В 1861 г. во Франции Куанье опубликовал книгу о 10-летнем опыте применения железобетона. Он же в 1864 г. построил церковь из железобетона. В 1865 г. Уилкинсон построил дом из железобетона. И только в 1867 г. Монье, которого часто считают "автором" железобетона, получил патент на кадки из армоцемента. В 1868 г. Монье построил железобетонный бассейн, а с 1873 по 1885 гг. получил патенты на железобетонный мост, железобетонные шпалы, железобетонные перекрытия, балки, своды и железобетонные трубы. В 1877 г. первая книга по железобетону опубликована Т. Хайэтом в США. С 1884 по 1887 гг. в Москве осуществлялось применение железобетона при устройстве

плоских перекрытий, сводов, резервуаров. В это же время проводились испытания конструкций, были реализованы железобетонные перекрытия по металлическим балкам…. В 1891 г. в России проф. Н. А. Белелюбский проводит широкомасштабные исследования железобетонных плит, балок, мостов. В этом же году выходит книга инж. Д.Ф. Жаринцева «Слово о бетонных постройках», а в 1893 г. – «Железобетонные сооружения». С 1892 по 1899 г. во Франции Ф. Геннебиком реализовано более 300 проектов с применением железобетона. В 1895 г. на 2 съезде зодчих в России выступает А. Ф. Лолейт, создавший впоследствии основные положения современной теории железобетона. В 1899 г. инженерный совет министерства официально разрешает применять железобетон в России. Первые нормы по проектированию и применению железобетонных конструкций появились в 1904 г. в Германии и Швеции, в 1906 г. во Франции, в 1908 г. в России. Развитие теории железобетона в России в первой половине 20 в. связано с именами А. Ф. Лолейта, А. А. Гвоздева, В. В. Михайлова, М. С. Боришанского, А. П. Васильева, В. И. Мурашева, П. Л. Пастернака, Я. В. Столярова, О. Я. Берга и др.

В XX веке железобетон является наиболее распространённым материалом в строительстве (см. Пьетро Нерви).

## Характеристики

К положительным качествам железобетонных конструкций относятся:

1. долговечность;
2. низкая цена — железобетонные конструкции значительно дешевле стальных;
3. пожаростойкость — в сравнении со сталью;
4. технологичность — несложно при бетонировании получать любую форму конструкции;
5. химическая и биологическая стойкость;
6. высокая сопротивляемость статическим и динамическим нагрузкам.

К недостаткам железобетонных конструкций относятся:

1. невысокая прочность при большой массе — прочность бетона при сжатии в среднем в 10 раз меньше прочности стали. В больших конструкциях железобетон «несёт» больше своей массы, чем полезной нагрузки.

Выделяют сборный железобетон (ж/б конструкции изготавливаются в заводских условиях, затем монтируются в готовое сооружение) и монолитный железобетон (бетонирование выполняется непосредственно на строительной площадке), а также сборно-монолитный (сборные конструкции используются как оставляемая опалубка - сочетаются преимущества монолитных и сборных конструкций)./*ru.wikipedia.org/wiki/**Железобетон***

# Unit 5
# Top 5 fire-resistant materials used by builders

**1. Translate:**
safety aspects, fire hazards, building structure, Fire Resistant Glass, fire hazard, steel frames, glass window, fire resistance properties, construction activity, plaster coatings, gypsum sheeting.

**2. Give derivatives of the following words, translate them:**
To protect – protector –
To construct – constructor –
To use – user –
To resist – resistor –
To explore – explorer –
To install – installer –
To add – additor –
To import – importer –
To provide – provider –
To perform – performer –

**3. Read and translate the text. Consult the words below if necessary:**

## A. Top 5 Fire-resistant Building Materials/ by Jane McGrath

How well can bricks withstand fire?

Residential fires kill more than 2,500 people per year in the United States alone [source: CDC]. And most fatal fires occur when people are asleep in their homes, as smoke can lull a person into a deep slumber [source: FEMA]. Ever wonder how your walls would protect you? While no practical building material is truly fireproof, well-constructed houses and buildings can help prevent such tragedies by using materials that are relatively fire-resistant.

Consequently, it's not a question of whether a fire can damage a structure, but a question of when. It simply takes longer for fire to affect fire-resistant materials. The key is to construct a building in which a fire would take effect slowly, allowing the occupants plenty of time to escape. This is also why materials themselves are rated in respect to how long it would take fire to affect its structural abilities. Even heavy timber can be considered fire-resistant. It's combustible, however, while metals like aluminum or steel aren't combustible -- instead, they tend to buckle under intense heat.

We'll explore some of the best building materials for preventing and impeding a raging fire.

B. **Adding Fire Protection** Structurally sound building materials, like steel, that don't have great fire-resistance ratings, can be protected from fire with flame retardant seals using foam, chemical or cementitious-based products [source: Danko].

Windows, important for visibility and light, can nonetheless be a fire hazard. Even before a window is in direct contact with flames, the intense heat of a nearby fire can cause the glass to break. And a broken window allows flames to enter a building easily. In addition, the heat from a fire outside might be enough to simply ignite flammable items inside a home without direct contact.

To protect your house, consider installing fire-resistant windows. One example is dual-paned glass windows, which, in addition to providing energy efficiency, also double the time it would take for fire to break the windows. The outer layer will break first before the inner layer. Tempered glass, which is heat-treated to make it about four times stronger than regular glass, is also effective.

Though they don't provide visibility, glass blocks are extremely fire-resistant while still providing light. Perhaps the best is wired glass, which is tempered glass with metal wire reinforcement. Doors that require fire resistance but also visibility often incorporate wired glass windows.

It's also wise to note the importance of window framing. Steel framing offers the best fire protection, followed by wood and aluminum. Vinyl is the least effective.

**C. Concrete helps slow the spread of fire.**/ By David Leahy

Concrete, one of the most common building materials, is also an excellent fire-resistant material. It is noncombustible and has low thermal conductivity, meaning that it takes a long time for fire to affect its structural, load-bearing ability, and it protects from the spread of fire. It's actually significantly more fire-resistant than steel, and often used to reinforce and protect steel from fire.

However, it's important to note that not all concrete is created equal. It consists of cement and aggregate, and the particular kinds of aggregate materials used can vary, as well as the amount used. Aggregate can make up 60 to 80 percent of the concrete's volume. The exact fire-resistance properties change depending on the type and amount of aggregate used. Natural aggregates tend not to perform as well. Moisture in the aggregate can expand when heated, causing concrete to sinter after long exposure.

Concrete is often listed among the best fire-resistant roofing materials, too. And you shouldn't overlook the roof as essential in fire-protection, since it's extremely vulnerable to sparks blown from wildland fire.

**D. Stop Fire and Stay Stylish**

Because of the versatility in finishing techniques, stucco can come in various colors and textures. This means that it's easily adaptable to various architectural styles, including Prairie School, Mediterranean, Tudor and Southwestern. This way, you don't have to sacrifice beauty for practical fire-resistant protection.

Stucco is a plaster that has been used for centuries for both artistic and structural purposes. Modern stucco is made of Portland cement, sand and lime, and it serves as an excellent and durable fire-resistant finish material for buildings. It can cover any structural material, such as brick or wood. It usually consists of two or three coats over metal reinforcing mesh. A one-inch (2.54-centimeter) layer of stucco can easily lend a 1-hour fire rating to a wall [source: Nazarro].

Roof eaves (overhangs) are a fire hazard, but they can be protected with an encasement of fire-resistant material. Stucco is often recommended as one of the best materials for boxing in hazardous eaves.

**E. Gypsum boards typically are treated to be even more fire-resistant**./ By Dorling Kindersley

Many structural materials will require underlying gypsum sheathing in order to achieve a good fire-resistant rating, and gypsum board is the most commonly used fire-resistant interior finish. Gypsum board, also known as **drywall**, consists of a layer of gypsum sandwiched between two sheets of paper. Type X gypsum board is specially treated with additives to further improve its fire-resistive qualities.

The paper on the exterior of the type X gypsum board burns slowly and doesn't contribute to fire spread. In addition, gypsum board has a noncombustible core that contains chemically combined water (in calcium sulfate). When affected by fire, the first thing that happens is that this water comes out as steam. This effectively impedes the transfer of heat through the gypsum board. And even after the water is gone, the gypsum core continues to resist fire penetration for a time. Builders often use multiple layers of gypsum board to increase the fire-resistance rating.

**F. Brick Still Isn't Perfect**

Unfortunately, brick can be expensive and heavy compared to other building materials. It's also not very effective at insulation, hence requiring supportive insulating materials to make a building energy-efficient.

If we learned anything from the popular children's tale of the "Three Little Pigs," it's that you should make your house out of brick. This isn't such bad

advice. Brick is not only resistant to a big bad wolf's huffing and puffing -- it's also resistant to fires.

As bricks are made in a fire kiln, they're already highly resistant to fire. However, it's true that individual bricks are much more fire-resistant than a brick wall. A brick wall is held together with mortar, which is less effective. Nevertheless, brick is commonly cited as among the best building materials for fire protection. Depending on the construction and thickness of the wall, a brick wall can achieve a 1-hour to 4-hour fire-resistance rating.

So, although some materials are more fire-resistant than others, several factors might influence a builder's decision, including cost effectiveness, ease of installation and climate. home.howstuffworks.com/.../**materials**/**5**-**fire**-**re**...

**4. Answer the questions to the text above:**

1. What house do you want to build?
2. What do we have to take into account starting to build a house?
3. What are brick qualities?
4. How long does a brick wall withstand fire?
5. What windows do you know?
6. What windows are discussed in the text?
7. What windows do you have at home?
8. What for is concrete used in construction?
9. How is plaster made up?
10. Where is gypsum used now?

**5. Words to the text:**

Call for –заходить, обязывать, требовать

Fire-resistant - жароупорный, несгораемый, огнестойкий, огнеупорный

intrinsic [ɪn'trɪnzɪk ], [-(t)sɪk] - 1) присущий, свойственный 2) важный, существенный

part and parcel - неотъемлемая часть

kiln [kɪln]- 1. печь для обжига и сушки 2. обжигать, сушить в печи (кирпич, керамику)

endurance [ɪn'djuər(ə)n(t)s ], [en-] - прочность, стойкость; сопротивляемость изнашиванию

mortar ['mɔ:tə] - известковый раствор; строительный раствор, скреплять известковым раствором

along with - наряду с

foolproof ['fu:lpru:f] = fool-proof; " защищённый от дурака" 1) а) защищённый от неправильного использования (о технических устройствах) , надёжный (в указанном смысле)

ensure [ɪn'ʃuə ], [en-] - insure - гарантировать, обеспечивать

combustible [kəm'bʌstəbl] - воспламеняемый, горючий

stucco ['stʌkəu] = plaster - штукатурка

roof overhangs – свесы крыши

gypsum ['ʤɪpsəm] - гипс

underneath [ˌʌndə'ni:θ] - внизу; ниже

enhance [ɪn'hɑ:n(t)s ], [en-] - увеличивать, усиливать, улучшать (обычно какое-л. положительное свойство)

PVC = polyvinilchloride - поливинилхлорид, полихлорвинил, ПВХ

**6. Say whether these statesments are true or false. Give correct answers(It's right…, right you are…; No it's wrong…, you are mistaken…:**

1. Plaster is not used nowadays.
2. Plasic windows are very popular now because they are ecologically safe.
3. We cannot say that gypsum is fire resistant.
4. Bricks are made of lime and fired in kilns.
5. Gypsum is another commonly used fire resistant material used in construction activity.
6. Builders never used multiple layers of gypsum coating on gypsum boards to enhance the underlying physical structure.
7. The use of a fire resistant glass will ensure almost foolproof protection not only from fire.
8. A normal window glass can easily break during a fire.
9. A large number of people lose their lives each year due to residential fires.
10. Gypsum is never used in construction activity.

**7. Write plan to the text above, then write an annotation.**

**8. Find in the text:**

Страшные пожары, огнестойкий (2), в отношении, продукты имеющие в составе цемент, огнезащитный состав, тем не менее, оконные рамы с двойным остеклением, закаленное стекло, иметь тенденцию, самый

обычный строительный материал, кровельный материал, энергосберегающий.

**9. Translate into English:**

**История появления огнеупорных материалов в России**

Ещё на заре человеческой культуры с получением огня появилась необходимость в огнеупорных материалах. В результате тысячелетий развития человеческого общества и его культуры огнеупорные материалы стали основой современных доменных, сталеплавильных, медеплавильных, цементно-обжигательных, стекловаренных и других печей.

Огнеупоры в виде кирпичей, изготовляемых из огнеупорных глин и каолинов, стали производить после появления доменных печей. В России — приблизительно в середине XVII века. При Петре I значительное количество такого кирпича делали из подмосковных глин. На протяжении первой половины XIX вв. производство огнеупоров развивалось преимущественно на металлургических заводах, будучи дополнением к общей направленности. Конечно, это пагубно влияло на производство, так как затормаживало работу и распыляло промышленный потенциал, однако из-за аграрной направленности страны эта проблема не решалась в течение долгого времени. Промышленная Европа, претерпевшая к XIX веку индустриальный переворот, имела в своём распоряжении вовсю работающие огнеупорные заводы, основанные ещё в период Наполеоновских войн. По данным БСЭ, первое специализированное производство огнеупоров было организовано в Германии в 1810 году.

С резким развитием промышленности и выдвижением класса буржуазии на решающие политические и общественные роли, Российская империя интересуется уже не кустарным производством огнеупорных материалов, а специализированной ветвью, которая должна быть основой огнеупорной промышленности. Первыми шагами в данном вопросе стало создание первых заводов: Белокаменский огнеупорный завод в Брянцевке (ныне г. Соледар) (1893 г.) и огнеупорный завод в Латной (1897 г.) имеющие узкую огнеупорную специализацию.

Производство огнеупоров в бывшем Советском Союзе сосредоточено в трёх основных промышленных районах: Южном (Белокаменка, Часов Яр), Центральном (Подольск) и Уральском (Первоуральск, Богданович).

На сегодняшний момент, наличие огнеупорной промышленности и качество огнеупоров в той или иной стране характеризует степень её индустриализации. Из более 212 стран мира, огнеупорная

промышленность имеется только в 35 странах. Более половины мирового производства приходится на долю СНГ и США.

Область применения: Огнеупоры имеют очень много областей применения, но всех их можно разбить на две основные группы, это огнеупоры (огнеупорные изделия, например, кирпич) общего назначения, и огнеупоры, спроектированные специально для какого-либо теплового агрегата. Огнеупорные материалы применяются в металлургической, стекольной, сахарной, машиностроительной, химической промышленности, а также во всех других отраслях, где проходит работа с применением доменных, шахтных и вращающихся печей.

*ru.wikipedia.org/wiki/Огнеупорные_материалы*

**1. What new useful facts did you find in the texts?**
**2. Was it difficult to translate?**

## Unit 6. Modern methods of construction (MMC)

**1. Translate the text;**
**2. Compile a terminological vocabulary;**
**3. Draw up a plan to the text;**

**1. Translate:**

concrete industry, Precast Flat Panel System**,** factory quality and accuracy, 3D Volumetric construction, service-intensive units, sound and fire resistance, ready-mix concrete, fast-track construction method, service zones, apartment blocks, student accommodation, Precast concrete systems, Construction speed, large-format concrete blocks, a face size, building envelope panels.

2.

The concrete industry embraces innovation and modern methods of construction (MMC) by offering concrete solutions which can be used to reduce construction time and promote sustainable development, as well as offering cost savings.

**Precast Flat Panel System**. Floor and wall units are produced off-site in a factory and erected on-site to form robust structures, ideal for all repetitive cellular projects. Panels can include services, windows, doors and finishes. Building envelope panels with factory fitted insulation and decorative cladding can also be used as load-bearing elements. This offers factory quality and accuracy, together with speed of erection on-site.

**3D Volumetric Construction**. 3D Volumetric construction (also known as modular construction) involves the production of three-dimensional units in controlled factory conditions prior to transportation to site.

Modules can be brought to site in a variety of forms, ranging from a basic structure to one with all internal and external finishes and services installed, all ready for assembly. The casting of modules uses the benefits of factory conditions to create service-intensive units where a high degree of repetition and a need for rapid assembly on-site make its use highly desirable.

This modern method of construction offers the inherent benefits of concrete, such as thermal mass, sound and fire resistance, as well as offering factory quality and accuracy, together with speed of erection on-site.

**Tunnel Form**. Tunnel form is a formwork system that allows the contractor to build monolithic walls and slabs in one operation on a daily cycle. It combines the speed, quality and accuracy of factory/offsite produced ready-mix concrete and formwork with the flexibility and economy of cast in-situ construction.

This fast-track method of construction is suitable for repetitive cellular projects, such as hotels, apartment blocks and student accommodation. It offers economy, speed, quality and accuracy, as well as utilising the inherent benefits of concrete, such as fire and sound resistance.

**Flat Slabs.** Flat slabs are built quickly due to modern formwork being simplified and minimised. Rapid turnaround is achieved using a combination of early striking and flying formwork systems. Use of prefabricated services can be maximised because of the uninterrupted service zones beneath the floor slab; so flat slab construction offers rapid overall construction, as it simplifies the installation of services.

In addition to saving on construction time, flat slab construction also places no restrictions on the positioning of horizontal services and partitions. This offers considerable flexibility to the occupier, who can easily alter internal layouts to accommodate changes in the use of the structure. Post tensioning of flat slabs enables longer and thinner slabs, with less reinforcement, and hence offers significant programme and labour advantages.

**Hybrid Concrete Construction.** Hybrid Concrete Construction (HCC) combines all the benefits of precasting with the advantages of cast in-situ construction. Combining the two, as a hybrid frame, results in even greater construction speed, quality and overall economy. HCC can answer client demands for lower costs and higher quality by providing simple, buildable and competitive structures that offer consistent performance and quality.

**Thin Joint Masonry.** Thin Joint Masonry allows the depth of the mortar to be reduced from 10mm to just 3mm or less, resulting in faster laying and improved productivity, particularly on long runs of walling. Construction speed can be further increased by some 13.5 per cent using large-format concrete blocks, which have a face size equivalent to two traditional concrete blocks. The mortar cures rapidly, achieving full bond strength within one to two hours, eliminating the problem of 'floating' therefore enabling more courses to be laid per day.

**Insulating Concrete Formwork.** Insulating Concrete Formwork (ICF) systems consist of twin-walled, expanded polystyrene panels or blocks that are quickly built up to create formwork for the walls of a building. This formwork is then filled with factory produced, quality assured, ready-mixed concrete to create a robust structure. The expanded polystyrene blocks remain to provide high levels of thermal insulation and the concrete core provides robustness and good levels of sound insulation.

**Precast Foundations.** Precast concrete systems can be used to rapidly construct foundations. The elements are usually to a bespoke design and cast in a factory environment, giving assured quality for the finished product. The foundations are often supported by concrete piles and connected together.

These systems improve productivity, especially in adverse weather conditions, and reduces the amount of excavation required - particularly advantageous when dealing with contaminated ground.

**3. Answer the questions:**

1. What modern construction forms can you name?
2. What for do engineers use different forms of construction nowadays?
3. What is precast flat panel system?
4. What is 3D Volumetric construction?
5. What is tunnel form? Where is it used?
6. What do flat slabs help reach?
7. What is Hybrid Concrete Construction?
8. Why is Thin Joint Masonry used in construction?
9. What is Insulating Concrete Formwork? What for is it used?
10. What is a foundation?
11. What can foundations be?

**4. Words to the text:**

sustainable [sə'steɪnəbl] - a) устойчивый; жизнеспособный b) (экологически) устойчивый (не наносящий ущерба окружающей среде)
inherent [ɪn'her(ə)nt] - a) обязательно присущий, неотъемлемый

robust [rə'bʌst] - a) крепкий, здоровый; сильный; твёрдый b) трудный, трудоёмкий, требующий затрат сил и энергии
repetitive [rɪ'petətɪv] - повторяющийся
cure [kjuə] - заготавливать
bespoke [bɪ'spəuk] (от bespeak) - сделанный на заказ

**5. Write an annotation to the text in English and in Russian.**

## Unit 7. Choosing Green Finish Materials/ By Shannon Sullivan

**1. Translate the text;**

**2. Compile a terminological vocabulary;**

**3. Draw up a plan to the text;**

"Green" finish materials can be difficult to define. Each product is defined as green according to its performance, its composition, or its lifespan, among other potentially green qualities. Some products may possess only one green quality, and others, many. It's helpful, when shopping for green finish materials, to keep certain guidelines in mind.

Before selecting new finish materials, it may be appropriate to determine whether they are necessary. Maintaining existing finishes conserves both energy and resources, as opposed to choosing new finishes even though they are considered green. Although green products are defined in part by their low impact on the environment, as new products, energy and material have been consumed in their production. Additionally, if a new product replaces an existing one, the existing material must often be discarded, if it cannot be reused or recycled.

It may be necessary to replace an existing finish, however. If the finish material releases or collects toxins, affecting the indoor air quality of a house for example, concern for health might outweigh the benefits of continuing to use it. Similarly, if an existing finish is inefficient or damaged, exchanging it for a green finish is appropriate. When building a new home, the use of green products is always beneficial.

When choosing a product, it is important to understand what makes it green. In order to truly know whether or not a product is green, one would have to perform a life cycle assessment. A life cycle assessment is an analysis of all stages of a product’s life: raw material acquisition, manufacture, transport,

construction or application, use and disposal. All energy and material used in any of these processes affects that product's level of energy efficiency, resource conservation and toxicity—in other words, its "greenness."

Of course, it is impractical to monitor production or acquistion of every product from cradle to grave. Many raw materials used in green products are not available locally, and manufacturers are scattered throughout the nation and world, making travel to these places problematic. Effects of a product during its lifetime could also be difficult to measure, requiring special equipment and a great deal of time. In short, performing a life cycle assessment on one product, let alone the many products used in a large project, is difficult, expensive and time-consuming.

The means to perform a complete life cycle assessment may be inaccessible, but certain principles can be used to help determine whether or not a product is green in the readily observable portion of its life. Reading the product's label, noting the geographic origin of the product in relation to one's own location, knowing how the product will be used, and knowing the method by which it may be disposed, all provide feasible methods of green product analysis.

When purchasing a product, look for recycled content listed on the label or in a description of the product. A recycled product uses fewer raw materials than an entirely new product of the same type. There are two types of recycled content in a product: post-consumer and pre-consumer. The latter is also known as post-industrial. In terms of conserving material use, post-consumer recycled content is the preferable choice over pre-consumer recycled content. Post-consumer recycled material comes from material that has already served one purpose, while pre-consumer recycled material is made from scrap left by industrial processes. Using pre-consumer waste to make recycled products is essentially the same as simply not wasting material during production. Both types of recycled content help conserve resources, however, and looking for recycled content on the label of a product is one way to determine whether or not a product is green.

Toxicity and resource efficiency should be taken into account when buying a green finish. Natural materials are more desirable than those made using petroleum or other chemicals. They are often less toxic and are more rapidly renewable. For example, bamboo grows rapidly, and is therefore a better choice of flooring than vinyl made from petroleum, in terms of resource conservation.

Another thing to keep in mind when searching for a green product is that minimally processed materials use less energy to produce than highly

processed materials. It may be difficult to determine how much processing went into a product when looking at it on the shelf, but the product itself can give clues to its history. Cork flooring, for example, remains in a state similar to its natural state when in its finished form. Vinyl flooring or carpeting, on the other hand, are very different than the raw materials that went into their production, indicating greater inputs.

The energy used in the creation of a product, including all activity from the gathering of raw materials through manufacturing and installation, is called its embodied energy. While embodied energy, along with the amount of processing a product goes through, is important to take into account when buying a product, the energy used, or energy saved, during the product’s time of operation is often more important. Concrete is a good example of this tradeoff. As an integral part of a passive solar design, concrete reduces a home's operational cost, even though it takes a lot of energy to produce (high embodied energy). Although there are certainly exceptions, "operational energy" generally trumps "embodied energy."

Durability is one factor that may qualify a product as green. When buying a countertop, for example, granite may be a good choice because it is durable. However, consider whether the durable countertop will endure in other areas. If the granite is fashionable now, will it still be in several years? Will the countertop be a feature future owners of the home will be likely to accept and continue to use? Be conscious of whether finish choices are enduring, and not overly reliant on the fashion of the time. A product’s durability comes to an end when it is discarded as old-fashioned.

When possible, combine structural and finish materials. Stained concrete flooring is an example of this principle. Combining functions eliminates the need for two separate materials. Therefore, products that can do both jobs at once are often worthwhile green finish choices.

Be aware of a product’s place of origin. The energy used to transport all the raw materials of a product, as well as the product itself, contributes to its overall use of energy; a quality that may determine whether or not the product is green. A product’s labeling will sometimes indicate its place of manufacture. Remember, however, that the raw materials may have come from much farther away. Buying local green products, when possible, is preferable.

**4. Write an annotation to the text in English and in Russian.**

Resources:


1. **5 Long-lasting Building Materials - HowStuffWorks**[ Электронный ресурс]. – Режим доступа: http://home.howstuffworks.com/home-improvement/construction/materials/5-long-lastin
2. **Огнеупорные материалы [Электронный ресурс]. – Режим доступа:** *ru.wikipedia.org/wiki/Огнеупорные_материалы*
3. The 10 Most Amazing Parties of All Time [Электронный ресурс]. – Режим доступа: home.howstuffworks.com/.../materials/5-fire-re..
4. ***Дерево в строительстве – Homeburg.ru****[Электронный ресурс]. – Режим доступа:* ***(www.homeburg.ru/****derevo****-v-stroitelstve.html По материалам публикаций каталогов "Дом.ua" и "Украинского строительного каталога" (Украина, Киев)***
5. ***Железобетон – Википедия*** *[Электронный ресурс]. – Режим доступа:* ***ru.wikipedia.org/wiki/****Железобетон*



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