



Modern Building Materials and Items and Their Importance

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Abstract: This article discusses the significance of modern building materials and products in the construction industry. The author emphasizes the benefits of using innovative and technologically advanced materials that contribute to the durability, sustainability, and energy efficiency of buildings. The article considers the importance of modern building materials in reducing costs, improving indoor air quality, and contributing to sustainable development. The author provides examples of modern building materials and emphasizes their contribution to the goal of constructing carbon-neutral buildings. Overall, this article is a useful resource for architects and engineers who seek to construct more efficient and sustainable buildings that comply with environmental regulations.

Keywords: modern building materials, innovative technologies, sustainability, energy efficiency, cost reduction, indoor air quality, carbon-neutral buildings, construction industry, environmental regulations.

Introduction. Modern building materials and products play an important role in the construction industry. They revolutionized the construction and design of buildings. Therefore, architects and engineers are constantly looking for innovative and technologically advanced materials that can be used to construct sustainable and energy-efficient buildings. The importance of modern building materials lies in their many advantages. For example, they are more durable and last longer than traditional building materials. They can withstand extreme weather conditions, fire and other destructive elements. This makes them perfect for building buildings that last a long time and require minimal maintenance. In addition, modern building materials are often lightweight and easy to transport. This makes them cheaper and reduces construction costs. Easy installation and customization make them ideal for building buildings of various sizes and shapes.

Literature review. The construction industry is constantly evolving with new technologies and materials being developed to improve building performance in terms of sustainability, energy efficiency, cost reduction and support for environmental regulations. This literature review this factors with depends without modern construction of materials present development and trends analysis to do directed. Last in years determined from trends one in construction carbonaceous neutral of materials is to use. Choi and to others according to (2019), hemp, wood and bamboo such as carbon free of materials use of buildings stability and energy efficiency significant contribution to add can This materials energy spending and buildings to build and to use with depends carbon waste decrease shown. In literature determined again one trend airgels, phase modifier materials and nanomaterials such as new innovative of materials is to use. This materials energy efficiency, heat insulation, fire durability and lifting ability improving different properties have (2018). From this except, construction in the industry rubber tires, plastic and like glass again processed of materials use waste disposal to do reduces and raw the item to save help gives (Serna and others, 2019). Also modern construction to the materials transition through expenses reduce potential supports. Ross and to others according to (2018), construction industry important economic to the effect have and global gross internal of the

product main from contributions is one Modern construction from materials use efficiency and efficiency to increase it is possible while expenses to save take will come To the advantages although modern construction materials with depends has been some one possible has been to shortcomings durability, availability and there is construction technique and materials with compatibility enters From this in addition to this of materials of some internal the air quality and to the environment effect with depends concerns rose (Hu and et al. , 2017). In general taking, seeing developed books that's it shows that modern construction materials stability, energy efficiency and expenses reduce point of view in terms of building efficiency increase for is an acceptable option. With that together with this of materials long term resistance to the environment effect and there is construction technique and materials with compatibility evaluation for next studies necessary

Research Methodology. The research methodology used for this article includes extensive literature from academic and industry publications on modern building materials, innovative technologies, sustainability, energy efficiency, cost reduction, indoor air quality, zero carbon buildings, construction industry and environmental regulations.. Sources used include well-known academic databases such as Science Direct, JSTOR, and Google Scholar. The research methodology involves synthesizing qualitative and quantitative data to provide insight into current developments and trends in modern building materials and their impact on sustainability, energy efficiency and cost reduction. The subject of the research, among other things, was focused on a comprehensive and proportionate analysis of the advantages and disadvantages of using modern building materials and innovative technologies in construction. Finally, the research approach applied a critical analysis of the data and provided recommendations for future research and development in this area. The methodology served to provide a solid foundation for the paper and to ensure that the findings were reliable, valid and consistent with the research objective.

Analysis and results. One of the most important advantages of modern building materials is their energy efficiency. These materials are designed to insulate buildings, reduce their energy consumption and reduce energy bills. They also help regulate indoor air quality, reducing pollutants and allergens that can harm human health. Another important advantage of modern building materials is their contribution to sustainable development. These materials are often made from environmentally friendly and renewable resources. They can be recycled, which reduces waste and greenhouse gas emissions. In addition, they help to build sustainable buildings that use less energy and water, contributing to the preservation of the environment.

Both architects and engineers are constantly innovating and exploring new materials to improve the construction industry. Modern building materials include insulated concrete forms, fiber cement, insulated metal panels, recycled steel and wood concrete, and more. These materials are designed to increase construction efficiency, reduce costs and improve sustainability. The importance of modern building materials cannot be overstated. They make it possible to build more efficient and sustainable buildings that meet modern requirements and comply with environmental protection regulations. In addition, these materials contribute to the goal of achieving carbon neutral buildings, which is essential for reducing global carbon emissions. In today's world, there are many modern building materials and products that are worth considering. Here are some recommendations:

1. Structural Insulated Panels (SIPs): SIPs are high-performance building panels that consist of a foam core sandwiched between two OSB (oriented strand board) panels. They provide excellent thermal insulation and airtightness, which helps reduce energy requirements and costs (Figures 1-2).



Figure 1



Figure 2

2. Cross-laminated timber (CLT): CLT consists of layers of wood glued together to form large, strong panels. These panels are used for floors, walls and roofs and can be an environmentally friendly alternative to steel or concrete. CLT is strong, lightweight and has a low carbon footprint, making it a popular choice in sustainable building design

(Figures 3-4).



Figure 3



Figure 4

3. Cool Roofs: A cool roof is designed to reflect most of the sunlight that hits it and keeps the building below freezing. This helps reduce energy costs and significantly improves indoor comfort in hot weather. Cool roofs can be made of a variety of materials, including paint, tile, and metal (Figure 5-6).



Figure 5



Figure 6

4. Low E windows: Low E windows help reflect heat. They have a special coating that helps reduce the amount of heat entering the building through the windows. This makes the interior more comfortable and significantly reduces energy consumption.

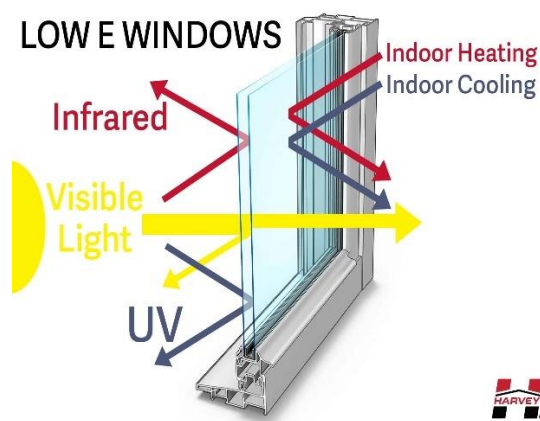


Figure 7

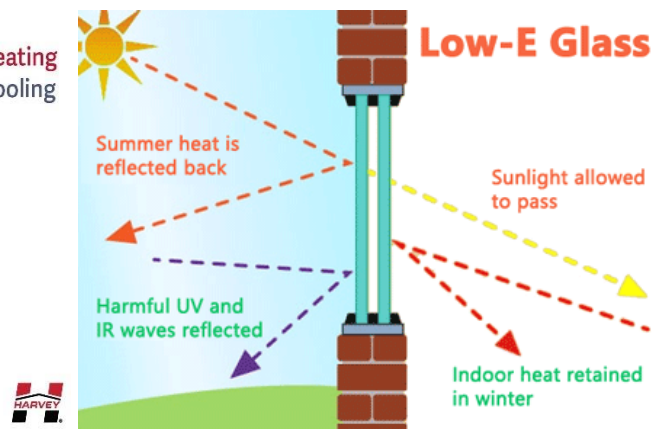


Figure 8

5. Green roof systems: Not all city dwellers have the opportunity to relax in nature or enjoy the mountain air. Often this is due to lack of time. daily city noise, narrow streets, high-rise buildings, busy cars have a negative effect on people. Green roofs are also important in that they relatively eliminate environmental problems in such a time of rapid development. Green roof systems are installed on the reinforced concrete foundation of any building with a slope of **0 to 12%**. Then the roof is covered with a layer of expanded clay, cement-sand and bitumen primer. Green roofs, also known as living roofs, are vegetative layers on top of a building that provide a number of benefits. They help reduce the urban heat island effect, which occurs when cities absorb and retain heat, and they also improve air quality by filtering pollutants. In addition, green roofs provide excellent insulation and even help reduce storm water runoff.



Figure 9



Figure 10

These are just a few examples of the many modern building materials and products available today. It's always a good idea to do your research and consult with experts to determine what's right for your specific needs.

The conclusion. In conclusion, modern building materials and products are necessary for the construction industry and their importance cannot be overestimated. They offer many advantages such as durability, affordability, energy efficiency and environmental friendliness. Whole the world stable to development attention in focus continue enough it is modern construction of materials importance increased keeps going

Reference:

1. Duggal S.K. Bulding materials. Xindiston New Delhi. 2008.
2. A.Sultanov, A.To‘laganov va boshq. Zamonaviy qurilish materiallari, buyumlari vatexnologiyasi. Samarqand. 2015-y.
3. Sulstonov A.A., To‘laganov A.A., Meliyev O.O. va boshq. Qurilish materiallari va buyumlari va metallar texnologiyasi. Darslik. T.: IPTD. O‘zbekiston. 2013-y.

4. Samigov N. A. "Qurilish materiallar va buyumlar". Darslik. Toshkent. 2013-yil 319 bet.
5. Krivenko P.V. i dr. "Stroitelnoye materialovedeniye". Uchebnoye posobiye. Kiyev 2007.
6. Kuldashv X., Negmatov Z.Yu. Lok bo'yoq ashyolari. Samarqand 2010-yil.
7. Isroilov S., X. Kuldashv. Qurilish materiallari va ishlari. Samarqand 2014- yil.
8. Donald N. Cornejo and Jason L. Haro (Editors) "BUILDING MATERIALS: PROPERTIES, PERFORMANCE AND APPLICATIONS" 2009. Nova Science Publishers, Inc. New York ISBN: 978-1-60741-082-9
9. Michael S. Mamlouk John P. Zaniewski "Materials for civil and construction engineers" - 3rd edit. Copyright © 2011, 2006, 1999 by Pearson Education, Inc., Upper Saddle River, New Jersey 07458. ISBN-13: 978-0-13-611058-3 ISBN-10: 0-13-611058-4.
10. Yves Mouton "Organic Materials for Sustainable Construction". 2011 in Great Britain and the United States by ISTE Ltd and John Wiley & Sons, Inc. ISBN 978-1-84821-224-4.
11. Jamal M. Khatib "Sustainability of construction materials" 2009, Woodhead Publishing Limited and CRC Press LLC Oxford Cambridge New Delhi ISBN 978-1-84569-349-7 (book).
12. O'zbekiston Respublikasi Prezidentining 23.05.2019 yil PQ-4335-sonli «Qurilish materiallari sanoatini jadal rivojlantirishga oid qo'shimcha chora-tadbirlar to'g'risida»ga Qarori.
13. Sindarovich, U. A., Dilnoza, Q., & Fayzullo o'g'li, B. A. (2023). National Traditions of Interior Architecture of Buildings of Wedding Houses. CENTRAL ASIAN JOURNAL OF ARTS AND DESIGN, 4(3), 1-7.
14. A.To'laganov., H.Kamilov., M.M.Vohidov., A.A. Sultanov. Zamonaviy qurilish materiallari, buyumlari va texnologiyalari. S. 2014 y. 139 bet.
15. Лысенки У.И. и др. Современные отделочные и облицовочные материалы. //Uchebno-spravochnoe posobie. –Rostov n/D: "Feniks", 2003. -448 s., sv. ill.
16. Uralov, A., & Baxodirov, A. (2023). *The History and Significance of the Construction of Hydrotechnical Constructions in Uzbekistan in the middle Ages (Example of Abdullakhan Bandi)*. Published in International Journal of Trend in Scientific Research and Development (ijtsrd).
17. Tulaganov A.A., Kamilov X.X. Teploizolyatsionnyy arbolit. ch-I.–Tashkent. TASI, 2011. - 151 s.
18. <https://aniq.uz/uz/yangiliklar/katta-shaharlarda-hva-oratiris-u-tur-tomlarga-rakht-ekish-kerak>
19. <https://harveywindows.com/inspiration/ideas-advice/3-main-benefits-of-low-e-windows-harvey-windows-doors>
20. <https://warmerinside.co.uk/low-e-glass>