

## Evaluation of New Technologies and Materials with a Sustainable and Industrialization Approach

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**Abstract:** In this paper, the use of new technologies in industrial methods of building to sustainability in architecture and design were discussed. Today, industry as one of the most important factors of sustainability in the design and use of new construction has played a role. Among these factors, reduced power consumption, fast construction time and reduce economic costs, which has attracted more attention to residents. Other important issues regarding the protection of the environment is the purpose of building waste reduction or recycling may also be effective. The need for housing in safe, inexpensive, and has a shelf life has become important in the building. Therefore, the scientific goals, achieve safe construction using new technologies in materials and sustainability and energy efficiency and sustainable architecture and design strategies for organizing industrial production building in the modular design also accelerates the time of operation of the project. Familiarity with local materials and traditional, the impact of technology in improving the quality of education, the impact of changes in technology and new materials in architectural spaces, pre-fabricated and modular design, origami, in accordance with the principles of sustainable development has provided ways of understanding these objectives and at a lower cost side building would be entrepreneur. Due to the nature of your research objectives in this study, a library and analytical software and has been observed, management concepts, work on the new technologies in traditional materials using modern technology, utilization of local materials, combining traditional architecture with contemporary architecture, modularity is designed and built in compliance with applicable rules and principles of sustainability and its proposed solutions. After analyzing the collected material and taking into account the population, including books, magazines, the media and with the results, findings, interactive traditional architecture with contemporary architecture, with technology and the use of renewable energy and using local materials and indigenous peoples in sustainable construction, as well as by examining the technologies used in the construction industry, the modular design inspired by the phenomena of nature, with a flexible approach to architectural spaces in front of climatic and environmental factors has been detected.

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### 1. Introduction

Use of energy and energy efficiency in construction as well as methods of using technology in materials for the building, of the things that often in sustainable design and construction and retrofitting of buildings play an important role. The use of traditional materials and industrial technology Modularity spaces and create harmony between traditional and contemporary architecture of the cases discussed in this project. The correct approach industrial production building from different directions can include long-term goals of policy makers is the construction industry. So that we can go with the right work culture in the society in addition to job creation, the quality of construction and to substantially reduce the useful life of the building.

Due to the rapid growth of the young population and consequently increase the number of housing applicants need to use industrial building due to mass production and time-saving construction is considered

seriously. Referring to some of the definitions of those terms, about technology and nano-materials used in advanced industrial materials and the use of recycled materials and creativity in the use of local materials and traditional techniques and some other cases it has been well represented.

### 2. Familiarity with local and traditional materials

The study also interact vernacular architecture or traditional technology are also considered to be. Followed by the issue of the use of local materials such as plastic bottles empty as materials innovative Mexico is discussed.

#### 2-1 Recycling material and how to use it

It's a must to make maximum use of existing materials, because otherwise more material must be produced and should use existing materials so that the need to transfer them to the landfill, or perform other operations on this matter can be prevented. All types of materials can be used at home, for example, wagon

wheels old metal can be used for opening and closing windows or a combination of waste paper and

concrete can be used for plastering walls. (Khorshidi and Ghaffari, 2012)

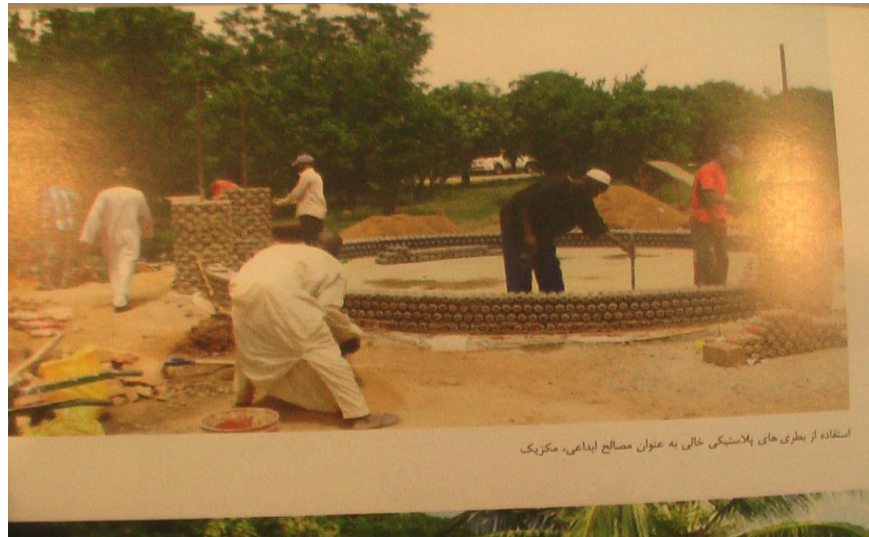


Figure 1. Technology with plastic bottles

Figure 1 shows using empty plastic bottles as innovative materials in Mexico. Natural materials, such materials are recycled, this technique minimizes contamination of food production to produce one ton of Portland cement, the amount of carbon dioxide released into the atmosphere. Another reason is health. Natural materials are affected to a lesser extent human health. Indoor air quality is a very important factor. (Khorshidi and Ghaffari, 2012)

One way to speed up the air exchange without reducing thermal performance at home is a breathing shell. It works by some of the materials such as walls or thatched wooden structures made easier. It is also better in terms of beauty and health of the building with natural raw materials or ingredients of natural origin to be made. The use of natural materials such as stone, glass, lime, plaster, brick, tile, unprocessed wood, cork, paper, bamboo, straw, natural fibers plants cited (flax, cotton, wool and etc.). As well as any building must be designed in such a way that the use of new resources to a minimum and at the end of their useful life, to create other structures create.

### 3. The impact of technology in improving the quality of education

In today's world many schools using information technology for knowledge transfer with regard to the information it used to be unlimited and inexhaustible. This is the starting point of architectural design, assessment of the employer's requirements and then explore ideas for responding to these needs through the use of intelligence, experience and creativity, is widely accepted. Tool for expressing ideas and

development activities should enable them to provide project. It provides various types of tools that can be useful for this choice. These tools include basic computer design, two-dimensional map (plan view and cross section) using the computer program AutoCAD, computer modeling and drawings have been Rando. Some of these tools, known in the definition of the design process (as previously mentioned) are able, while others completely new abilities and thus provide a variety of techniques. IT tools have the internal capability to produce a wide range of curriculum and communication of ideas and innovation, covering the distance between the engineering students are understanding and acceptance. (Mousavi et al., 2011).

Now the use of new technology and progress is developing day by day. But the question arises that how information technology can improve the architectural design?

As mentioned in previous entries in the literature, IT tools to help strengthen and perhaps upgrade manual methods, including architectural design sketch, official formed and maps are available modeling and information technology tools and new techniques and animation in the form of parametric AutoCAD Architecture enables designers to use. In addition, already noted that the main tools of information technology as a means of architectural design process is not intended to be, but they can be considered as a means to accelerate the design process. It was also found that tools are very strong in growth ideas, however, IT tools, communication and transfer of information to the audience and also allows

the use of very strong materials can act. It should be noted that in addition to the fact that professional training in architecture technology, including software architecture and software such as AutoCAD drawing, etc. And so today the integration of ICT in education, the educational systems around the world fully accepted and it seems that the movements of engineering institutions to take advantage of new information and communication technologies in teaching process he needed to learn the basic steps and learning environments. Because this technology for all sections of society in general and in particular for some specific groups with hair location and provides certain restrictions lot. In this context, many changes have taken place in higher education and training architecture has been a worldwide basis. The use of modern educational tools in learning: such as video projectors, using online systems, digital tools to design and sketch called Leap Motion, graphical software, widely used in digital pages are growing and significant impact on the promotion of architectural education have. Use these tools to make changes in the educational process. So in addition to m-learning IT change and transform spatial structure also makes educational spaces and new trends in education are presented. This is one of the changes in the design of educational facilities space design layout and interior design changes its nature will change and spaces for theoretical and practical courses is architecture?

Classes and Workshops will be multi-purpose use. On the other hand these spaces changes teaching and learning processes will change. Participation of students in theoretical and practical discussions in these spaces will increase student learning is required. So will teach a one-dimensional aspect.

#### **4. The impact of technology and transformation of new materials in architectural spaces**

Technology and new technologies has led to new developments in architectural spaces, knowledge and familiarity with the ways of building more and new technologies to understand how they transform architectural spaces is required. In the context of economic, physical and cultural accurate with the selection criteria and based on a profound theoretical basis for the design and construction suitable areas of social, cultural and human climate and maximum performance can be useful and desirable architectural spaces. The greatest advantage of these technologies involves identifying and studying them. (Sepahvand and Khoshrou, 2012)

The word technique originally a French word and the concept of technology, industry, science, art and technology professionals, technology, science, technology and industry in the covers.

Including the definition of science and technology in place to:

"The application of scientific knowledge and knowledge is another regular, for practical matters organized by systems that include people, organizations, objects and machines to be alive" (Pysi, 1988)

The quantity and quality of human societies, the increasing need of people have been forced to extend the technology. With the arrival of the Industrial Revolution and the subsequent advancement of technology has great development in various fields of human societies emerged, in the field of architecture and construction and its impact on the form and architectural spaces substantial (Sirrus and Razmjounejad, 2012).

##### **4.1 Impact of technology on local spaces**

One of the important elements of Iranian architecture courtyard is shaped accordingly. Tom There Garden factor for wind, water, sun and the chlorophyll which is involved in all human comfort. Old building yard as space is communication between residents with nature and that human activities such as recreation or eating and resting in this environment and the surrounding area was organized. Gardens and trees in addition to providing shade and beauty compensates for ambient humidity poverty. Today, with the advent of technology and increasing land prices and pushed it high into the central courtyard of the old deleted and has been replaced by high-rise buildings. Yard in a building used by the body and has no role in organizing the surrounding space. In this regard, the proposal for the shortage and its consequences efficient use of space and the use of green roofs are planting.

Green roof also called plant roof and biological roof, structural engineering is a lightweight system that plant growth possible in the roof and at the same time protects the roof. The roof is actually a living surface of plants growing in soil layer on top of the roof. Grass roof, a conventional building techniques in many parts of the world. The green roof with the goal of environmental health, economic and modify to improve storm water management issues in town and attention to aesthetics. Recent trends in green architecture, also includes a variety of (green walls), Oxygen walls, facades, green and other names in the industry. Today, the green roofs, green walls are also covered.

##### **4. 2 Impact of technology on forms of vernacular architecture**

The impact of technology in architecture and forms can be found in wind towers. Windward is part of the building as enjoying the wind and move it in space to cool the indoor air is used, elements and systems such as these systems are disabled. The desert

cities of electric machines and services that today provides us energy, so less expensive responded. Technologies have significant impacts on architectural forms, including removal of buildings desert wind and replace it with ventilation systems, air-conditioners, which are supplied with human comfort technology systems also brought a lot of costs (Sirrus and Razmjounejad, 2012).

#### **4.3. Advantages and disadvantages of the effects of technology on architecture**

By the steps mentioned below, advantage and disadvantage of a technology including green roofs are summarized in the following points.

- Improve air quality "and 85% filters the dust particles."
- The cooler air and moisture through evaporation
- Collect 30 to 100% of the annual precipitation through a drainage
- Landscape provides serenity and beauty
- Reducing the need for wastewater management practices and extend the life of roofs
- Reduce the cost of alternative heating and cooling open spaces where structures are located

#### **5. Pre-fabricated and modular design**

In this type of design of systems analysis begins. Digges designer can later stages of the administrative issues and where the structural elements are industrially produced, they must have a size that is Peymoon. System and Peymoon function and each other and form the basis for the plan. Peymoon system topics including history, changes in the cost of building.

##### **5.1 Advantages and disadvantages of modular design**

Because of the high wage cost of construction through the traditional expensive, but a long time to run, sleeping and long-term capital cost to rent the machinery and building enforcement operations, these costs will increase. The construction industry by reducing the duration of their products, stand out against rising prices and even for some products such as vehicles and floors of industrial production, the prices are lower. After starting industrial production in the country by reducing the cost of building its advantages over traditional methods appeared. That by modernizing reduce costs, implemented in the shortest time, requires less manpower and avoid additional costs for transport by manpower accurate monitoring of operations and implementation resulting in easy operation and fast industrial production is one of the greatest benefits. However, as industrial production and manufacturing, the quality of handmade products will be different, so the improvisation and small errors handmade work, giving way to accurately measure

industrial products that benefit from all the technical advantages of machine production. Color components of the machine which automatically covers parts: one hand is much more of layers that can be torn by hand (Carlo Testa, 1988)

Prefabricated buildings also have disadvantages, including height restrictions imposed on them, ignore some tastes and reducing diversification due to mass production and series - the apparent monotony of these buildings even freedom of choice and variations in the materials and architectural firm also benefits from the use of these methods affects.

##### **5.2 effective modular design approach in the development of sustainable housing**

Peymoon building systems in the world are as follows:

- System page contains a gallery of fortune the size of a wall or the entire wall charts for cleaners or porters.
- System frame (skeleton) which operates cargo to the skeletal frame. Between them, the non-load-bearing walls separating the two groups in other words, are used.
- Volume or cell systems for different cells, the size of the rooms, which are load bearing and are made of the same offenses. (Carlo Testa 25, 1988)
- Modular Design Construction is a method where to run and how to build buildings using prefabricated materials is carried out. Included in the Nordic countries and the United States Malgan and buyers face higher costs than estimated, they are supported, the houses are very common. (Carlo Testa 26, 1988).

#### **6. Origami**

Another technique is the name of the ancient Japanese art of origami making means is folded pages that combine "our" means fold and "kami" means paper is folded many first principles calculations origami are created and then transferred to other disciplines.

To define ancient Japanese artists inspired by natural phenomena (plants and animals) by folding the pages of the paper models built, it was called the art of origami (Hassanzadeh Firuzi and Kalani Moghadam and Bakhshi, 2012, 866).

Origami, the ancient Japanese art, creative way of folding the paper to create beautiful shapes and forms. After that the work of art outside of Japan became popular in the mid-twentieth century into modern art and become a source of inspiration for many artists around the world and in many areas of the arts, such as architecture. An attempt to create architectural designs include origami designs based on concepts ranging from residences to hotels, entertainment centers, offices, and so on. The



important point is that Origami has become one of the artistic trends in contemporary architecture.

Method of making paper appears in about the year 100 BC in China began more than five hundred years was kept a secret. In the sixth century AD by Buddhist monks from China to Japan entered the industry. Then in the mid-eighth century, and after the Muslim Arab conquest of Central Asia, the industry was taken by them to other locations and in tenth century AD Egypt and came to Spain in the twelfth century AD. After the arrival of the Arabs in Sicily Italy was the industry and papermaking workshops in 1276 in Fabriano in Italy and France were started in 1969 in Troy of France.

From this time onwards, from the second half of the fourteenth century, paper for books became popular in Europe. Although the beginning of this century in England spread the use of paper, but paper first workshop was held in the fifteenth century in

Hertford, England. The first workshop production in North America was created in 1690.

Some believe that the first bend a paper in China has become commonplace. Use paper Mock funeral home for cremation reason for this claim. But there is no doubt that the Japanese had perfected the art of folding the paper and gave it to his words out. The high cost of making paper requires that the art should be used only for special events, such as paper butterflies male and female have been used to decorate the cup at weddings. In different periods of history of Japan, Origami is present. The fourteenth to sixteenth centuries during the Muromachi period (1333 - 1573) Modern Origami principles have been written by an anonymous author. Then, in the Edo period (1603 - 1867) origami as a hobby Orisue comprehensive income, which at the time was called. Origami phenomenon can be found in many important cultural buildings such as seen in images 2 and 3.



Figure 2. Festival Hall Festival

The black angled concrete hall by the architectural firm Delugan Meissl after winning the competition to design the project was designed and built in 2007. Building a new Festival Hall means the

contrast with the white curved building with the theater was near it. Of course, the form and location of the new hall completely with the surrounding landscape and historic buildings associated with it.



Pictures 3. Museum of Art, Tel Aviv, Israel

The museum is located in the center of the cultural city. On the one hand, this building is very compact site and triangular in shape and on the other hand, the museum needed to collect a large rectangular galleries. The solution was: the surface geometry of the buildings were designed so that disparate angles between the galleries and the buildings are interconnected. The building was designed by the architectural firm Preston Scott Cohen Prize winner Herta and Paul were International.

#### Conclusion:

The research conducted in this paper, it can be said that today's technology has created a change in the architecture and design and important principle is that all the progress that can be achieved in the industry today. The formation of new ideas is an important factor in the genesis of the ideas of saving costs, especially the cost of construction and that the response to the question of how we can take to save money and by what method can reduce construction costs and at high efficiency and less administrative time and efficiency played a role. It must be said that the use of modern materials technology that features traditional and indigenous materials also have practical terms can be useful that this is due to the

innovations and technologies that provide the architectural community and the today's industry.

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