

**BUILDING SYSTEM TECHNOLOGY AND NATIONAL ECONOMIC
EMPOWERMENT DEVELOPMENT STRATEGY**

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ABSTRACT

Increased demands on the built environment require continued and enhanced research and development activities in building system technology. Traditional building technology can be considered to be well developed. Never the less society continues to demand improved competitiveness, customer and user satisfaction, sustainability, quality and safety of the built environment. Global warming is a serious problem facing the world today. In order to stop or reverse this problem, the construction industry must change from the traditional method of building to the green building concepts. Making building green will greatly impact this problem. There are many ways for this to be done. This study has pointed out some aspects that constitute building system technology practices in the building industry in the resent time. The study further reveal the impact of building system technology and updating the knowledge and the skills of building practitioners, thereby enhancing the National Economic Empowerment Development Strategy. Some recommendations among others made were training for specific green building application are necessary; and green job apprenticeship programme should be offered in technical colleges and polytechnics.

**Keywords: Building System Technology, National Economic, Empowerment
Development Strategy.**

INTRODUCTION

The building industry represents one of the largest, and most important, enterprises in the world. For fast-growing economics in the world, there is a growing demand for practical, sustainable building designs that will provide a higher standard of living with minimal resource demand. Many of these problems are being met by innovations in building technology. These innovations, for example, apply recent advances in the fields of materials, manufacturing and thermo sciences to the construction of new buildings, to the retrofit or rehabilitation of exiting building and to the efficient operation of buildings.

Since the large demand has been placed on building material industry especially in the last decade owing to the increasing population, which causes a chronic shortage of building materials the architects and civil engineers have been challenged to discover useful building and

construction materials. The increase in the popularity of using environmental friendly, low cost and lightweight construction materials in building industry has brought about the need to investigate how this can be achieved by benefiting to the environment as well as maintain the material requirement affirmed in the standards.

New developments are made everyday in the field of engineering that are meant to save energy and protect the environment. This is a very important time to be conscious of energy consumption, due to global warming. Naturally there will be experts constantly creating new technologies in this field. While green building construction may appear costly for consumers, new developments in the engineering field are providing increasing cost-effective solutions. Even though green engineering is coming to the forefront of society now, it has been around and developing for many years.

Building and the Need for Building

Buildings are provided to meet a primary physical human need, which is shelter for man, his goods, animals and services. Buildings are also erected by man to meet his spiritual needs, recreational activities need and his other works.

The Function of a Building

A shelter is primarily a protection from the elements and the function of a building is to enclose space and to create a satisfactory (internal environment) relation to the purpose of that particular building. This means that the space within the building must provide suitable conditions, which will enhance the proposed activity or purpose of the building. It must also provide comfort and security to the occupants. The shelter is therefore referred to as “environmental envelope” (Iroegbu, 2003) when it fulfills the above function.

Weather conditions as experienced through the various weather pose one problem or the other, which is able to affect man and his works. Buildings especially when well designed and adequately executed provide a penance to both weather change and effect.

The Built Environment

The element of the built environment consists largely of accommodations for living, working, storage, recreation, spiritual needs, facilities for transport etc. These elements make up the built environment made by man for himself over the years.

- a. Living Accommodation:** This is the dwelling place for man, his family, relations and friends. This accommodation protects the man from the elements by providing, internal conditions favourable to him. It equally, provides a place where one can separate himself from the activities of office or business at the end of the day’s labour. Living accommodation could be in form of bungalows and could also range from low rise building which could be either one to three storeys in height while high rise buildings are those whose height go beyond seven storeys.
- b. Working Accommodation:** This is accommodation provided outside the home or dwelling place who object is to provide an environment suitable enough for man to carry out his work which may range from commerce and industry to public work places, institutions and private

business. We therefore have the following groupings: (i) factories (ii) shops (iii) business centre (iv) offices (v) institutions

- c. Storage Accommodation:** The storage accommodation in some ways involve accommodation that can be specially designed in form of; ware house, where either manufactured goods or goods of harvested are stored until they are required to be used or done with sometime in the future.

Another form of storage could be in form of shades for goods and materials that can thrive well with free air but which could be endangered by contact with moisture. Reservoirs and silos also form part of storage accommodation.

Storage accommodation can be grouped as: (i) warehouse (ii) shade (iii) reservoirs and silos and cool rooms.

- d. Recreation Accommodation:** As the saying goes, all work and no play makes one dull and lazy. More to this, lack of recreation can led to accumulation of tension with its attendant negative consequence to health. Man needs to rest, recuperate when he departs from the work environment for a moment. Recreation helps to relieve tension and could be in form of:

(i) **Sports Facilities,** Concert hall (ii) stadium (iii) libraries (iv) art galleries
(v) Museum (vi) cinemas etc.

- e. Spiritual Accommodation:** Man when he realizes himself as being made of spirit, soul and body need to foster his vertical relationships with his creator. This is affected when man is present in the accommodation. Churches and other places of worship come in this category.

- f. Facilities for Transport:** An interesting aspect of our present civilization is the availability of vast road infrastructure, airports and seaports for effective movement of people and goods. This has enhanced comm. erce and industrial activities from the local level to national and international level. These means of transportation require special terminal buildings such as bus station, railway stations buildings at airport and seaports or harbors.

Facilities for Transportation can be summarized as:

- i. Road network with bus stations,
- ii. Railway network with railway stations,
- iii. Sea ports with harbors and canals
- iv. Airports with terminal buildings

Historical View

Engineering has been as man's service since the beginning of civilization evolution. Human activity in the field of construction engineering goes far back into the past, when man observing nature around him began to imitate and improve it in order to create safer and better living conditions. Moreover, relatively early he noticed that his engineering "work" apart from reliability, durability and functionality had to have elements of harmony and beauty. This calls for continuous innovations in the field of building system technology.

Ancient Communities

First of all, ancient communities had at their disposal natural materials such as stone and timber. In the course of time, they learned how to use clay to form bricks, which were first dried only in the sun and then baked. In the main civilization centres (the Middle East, the Near East,

and the Mediterranean region) the hot climate and inconsiderate economy led, in a short time, to the elimination of timber as a building material. Stone and brick brittle materials dominated architecture in the region of European civilization for several centuries: from stone pyramids in Egypt 3000 years B.C until the so called first industrial revolution in England (the turn of the 18th and 19th centuries). They were suitable building materials for erecting walls and columns but at the same time, due to their low tensile bending strength, they caused a lot of problems in horizontal elements. Therefore a valued arch that was popular in ancient Rome, semicircular in its primary form, was the pattern that was to be employed for elements or structures of larger span. The arch course of time become lighter and less massive.

Building technology is a dynamic profession, and as ideas emerge, new techniques will also be device especially in the way of doing things. Today buildings system is no more what it uses to be, we are running fast with the time. The idea of smart materials, smart buildings, innovative building technologies and green building construction are coming into the system pursuing the global vision for building technology. What are they?

Smart Material: Smart materials are materials that have one or more properties that can be significantly altered in a controlled fashion by external stimuli, such as stress, temperature, moisture, pH, electric or magnetic field. There are a number of types of smart material, some of which are already common. Among the various existing smart materials are: piezoelectric ceramics, electro active polymers, and shape memory alloys and carbon nanotubes (CNTs), which exhibit extraordinary mechanical properties. Those materials differ in the structural and electrical characteristics making them promising for developing unique and revolutionary smart composite materials.

Smart Building: Smart buildings LIC (a US-based engineering and design firm) offers this definition: “A smart building is the integration of building, technology, and energy systems. These systems may include building automation, life safety, telecommunications, user systems and facility management system. Smart buildings recognize and reflect the technological advancements and convergence of building systems, the common elements of the systems and the additional functionality that integrated system provide. Smart buildings provide actionable information about a building or space within a building owner or occupant manages the building or space.

Innovative Building Technologies and Practices

Innovative building technologies and practices save energy and money. Investing in energy efficient technologies and practices allows building owners, developer, and occupants to realize cost savings in homes and buildings that are more comfortable, productive and marketable. These technologies and the whole building approach will produce buildings that use less energy and reduce future maintenance cost.

Green Building

Green or environmentally friendly, building construction is becoming a very popular topic in current culture. The possibilities of green building are heading newspapers, challenging engineers, and becoming lead issues in the society. According to Jeff Komblau (2008), director

of sales and marketing for Eagle Construction of VA “we wanted to reach under the finishes of our homes to inject quality that is not visible but creates comfort and is seen in the saving created each month with a smaller carbon footprint”. (Childers 2008). Even local businesses such as Eagle Construction are beginning to see the benefits of green building construction. Although, when most consumers look at green products, they see an environmentally friendly product with a hefty price.

Most green engineered products are meant to consume less energy, saving the consumer money in the long run. This is a very important time to be conscious of energy consumption, due to global warming.

Most Appropriate Methods:

1. Solar energy is most definitely the greatest known form of energy producing their own energy from the sun. This technology has been around for quite a long time, but it still growing in popularity, as well as quality in some areas (M. J. Sowick, Conversation, January 28, 2009). An unusual and expensive technology ten years ago is now a cheaper, more common energy alternative.
2. The use of natural light is becoming very popular in modern large buildings. Buildings can have many skylights and windows to get natural light deep into the interior. The artificial light in the building could then dim or turn off when there is sufficient amount of natural light. This natural light was used in the California Academy of Science in San Francisco’s Golden Gate Park (Green building incorporates). Most other buildings are there that utilizes natural light more close to home, windows and skylight, admit natural light.
3. Green construction can be implemented through choice of building materials as well. It is also environmentally, economically, and energy efficient to use materials that are close to the building site, decreasing the amount of oil use as well as air pollution. It would actually be very green, economically beneficial, to renovate an existing building than build a whole new one. This would prevent the pollution of all new materials and save ecosystem that the building would be destroying.
4. While most of these green engineering techniques gives backs to the environment by decreasing the amount of energy usage, same techniques can help the local habitat more directly. Green roof are becoming more popular and effective. A green roof is one with a layer of soil and vegetation growing on top of it. It benefits the building as well as the habitat in many ways.

It helps the environment, in that it provides a habitat for wildlife that were likely there before the building was built. The water run off from the top of a green roof also drains cleaner than it was before it hit the roof. Green roofs also benefit the buildings, in that they are a great insulation blocking out the hot sun in the summer or keeping the heat from learning the building in the winter, (green building incorporates). In 2005, sun Trust Bank in Richmond “converted the top of a four-story building on main street down town to an 11,800 square foot “green roof”, covered with draught resistant plants that consume carbon dioxide and absorb storm water” (Springstone, 2009).

While most attention of green building experts is put on making large building green, homes and smaller buildings can also use green methods of construction. Homes may not always find it efficient to use the same techniques as large building in order to be greener. But certainly simple techniques can still be useful such as natural highlighting or eco-friendly and energy saving light bulbs would help. There are also different ways that homes could be heated and cooled in an energy efficient way, such as a geothermal heating and cooling system. This type of system would use the earth's temperature conditions to regulate the temperature in the building (M.J. Sowick, conversation, January, 280, 2009).

Although the present day practices in green building construction are important, the real success lies with the future. The future is what will transform the entire world into a place that is self-constructive, rather than destructive. Even more beneficial than new technologies arising is the improved of existing technologies to make them greener, more user friendly, more cost efficient.

Conclusion

Findings have touched the building and the impact of modern building system technology, the built environment, the historical view, the ancient communities, smart building materials introduce into the system, smart building, innovative building technologies and practices, as well as green building construction.

It is logical to think that, in the immediate future, urban growth and its infrastructure will continue to improve due to the impact of modern techniques of the natural construction technology, through the use of smart building materials and energy. The number of construction works shall progressively improve, these shall be possible by attempting to achieve the paradigm of sustainability, demanding an increasing durability of what is being built in order to minimize environmental impact.

Green building construction and the methods is rapidly growing in both popularity and importance because there are many businesses that are taking advantages of this technological changes that is affecting our environment. People have to alter their lifestyles in order to reverse the damage that has been done, hence putting off action until tomorrow is not a good option. In addition to saving the environment, the growing intelligence of green engineering and building construction will help consumers save money and reducing their energy consumption. These are some aspects of the National Economic Empowerment development strategy in the building system technology.

Recommendations

Based on the findings of the study the following recommendations were drawn:

1. Training for specific green building application are necessary.
2. Green construction training programmes that can enable the trainee gain the skills they need to find work in the green construction industry are needed
3. Green job apprenticeship programme should be offered in technical colleges and polytechnics
4. We must change our life styles to halt a disaster that is affecting our environment.

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