Green Building and Indoor Air Quality: Sustainable Approach

Santosh Zargar

Abstract-- **The term 'green' is the measure of environmental friendliness and environmental friendliness or eco-friendly or nature-friendly are marketing terms referring to goods and services, laws, guidelines and policies that inflict reduced, minimal, or no harm upon ecosystems or the environment. In order to be sustainable, the environmental pressures of increased demand for resources coupled with a rapidly changing climate are being addressed by policy makers at various levels. The application Green building concept provides energy savings (40-50% less energy compared to conventional building), water saving (20-30% less compared to conventional building), healthier homes & offices, waste minimization, cost saving & economic benefits, enhanced image marketability, enhance the occupancy rates as well as lower capitalization rates potentially reflecting lower investment risk. For the existing buildings and green building, Indoor Air quality is one of the major tools to improve occupant health & productivity. The rapid increase in Indian population has given rise to an enormous demand for buildings with a subsequent pressure on availability of resources leading to have sustainable development.**

Now days, the term 'green' is the measure of environmental friendliness and environmental friendliness or eco-friendly or nature-friendly are marketing terms referring to goods and services, laws, guidelines and policies that inflict reduced, minimal, or no harm upon ecosystems or the environment. In order to be sustainable, the environmental pressures of increased demand for resources coupled with a rapidly changing climate are being addressed by policy makers at various levels. However, as in most countries, there is a huge scope to optimize the effectiveness of policy by encouraging a more holistic life-cycle approach to building. Internationally, voluntary building rating systems have been instrumental in raising awareness and popularizing green design as most of the rating systems devised have been tailored to suit the building industry of the country where they were developed. The International Organization for Standardization has developed ISO 14020 and ISO 14024 to establish principles and procedures for environmental labels and declarations that certifiers and eco-labellers should follow. The rapid increase in Indian population has given rise to an enormous demand for buildings with a subsequent pressure on availability of resources.

The term green somewhere linked to natural. Natural building is an umbrella term than connotes any sort of building that is accomplished with the use of natural materials primarily, as opposed to the use of man-made or industrial materials. The concept of natural building which is usually on a smaller scale tends to focus on the use of natural materials that are available locally. However, a green building is an outcome of a design which focuses on increasing the efficiency of resource use like energy, water and sustainable materials while reducing building impacts on human health and the environment during the building lifecycle, through better design, construction, operation, renovation, and demolition. Sustainability may be defined as meeting the needs of present generations without compromising the ability of future generations to meet their needs. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Although new technologies are constantly being developed to complement current practices in creating greener structures, the common objective is that green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment by efficiently using energy, water &other resources, protecting occupant health & improving employee productivity and reducing waste, pollution and environmental degradation.

In general, green building does not specifically address the issue of the retrofitting existing homes/buildings. For the existing buildings and green building, Indoor Air quality is one of the major tools to improve occupant health & productivity. The contaminated indoor air leads to Sick Building Syndrome (where more than 30 percent of occupants experience adverse effects while in the building, but no clinically diagnosed disease is found), Building Related Illness (general term for a medically diagnosable illness caused by, or related to, building occupancy) and Multiple Chemical Sensitivity or Environmental Illness (controversial condition where an individual has or develops sensitivity to even low levels of certain chemicals due to extended exposure). Indoor Air Quality seeks to reduce volatile organic compounds (VOCs) and other air impurities such as microbial contaminants. Buildings rely on a properly designed ventilation system to provide adequate ventilation of cleaner air from outdoors or recirculated filtered air as well as isolated operations (kitchens, dry cleaners, etc.) from other occupancies. During the design and construction process choosing construction materials and interior finish products with zero or low VOC emissions lead to improve IAQ. Most building materials and cleaning/maintenance products emit gases, some of them toxic, such as many VOCs including formaldehyde. These gases can have a detrimental impact on

Lab Manager, Bhagavathi Ana Labs Pvt. Ltd. (A Bureau Veritas Group Company), A1, 256/1, BOB Line, Makarpura GIDC, Makarpura,Vadodara, Gujarat 390010

occupants' health, comfort, and productivity. Avoiding of these products increase building's Indoor Environmental Quality. Also important to indoor air quality is the control of moisture accumulation (dampness) leading to mold growth and the presence of bacteria and viruses as well as dust mites and other organisms and microbiological concerns. Water intrusion through a building's envelope or water condensing on cold surfaces on the building's interior can enhance and sustain microbial growth. A well-insulated and tightly-sealed envelope will reduce moisture problems but adequate ventilation is also necessary to eliminate moisture from sources indoors including human metabolic processes, cooking, bathing, cleaning, and other activities. While evaluating IAQ, various standards defined by USEPA, ASHRAE, ACGIH NIOSH and OSHA are followed.

There are organizations that provide third-party credentialing and verification for several rating systems relating to the built environment. Green Business Certification Inc. (GBCI) , American organization, established as the Green Building Certification Institute with the support of the U.S. Green Building Council to provide independent oversight of the Leadership in Energy and Environmental Design (LEED) project certification and professional credentialing processes. The LEED is globally accepted benchmark the design, construction and operation of high performance and environmental friendly buildings. LEED India provides building owners, architects, consultants, developers, facility managers and projects managers the tool they need to design, construct and operate green buildings. LEED awards credits in five key areas, namely, sustainable site & development, water saving, energy efficiency, material & resources and indoor environmental quality, and provides Silver, Gold and Platinum certifications based on the rating system. The Indian Green Building Council (IGBC), part of the Confederation of Indian Industry (CII) has the vision "To enable a sustainable built environment for all and facilitate India to be one of the global leaders in the sustainable built environment by 2025". All the stakeholders of construction industry comprising of architects, developers, product manufacturers, corporate, Government, academia and nodal agencies participate in the council activities through local chapters. The council also closely works with several State Governments, Central Government, World Green Building Council, bilateral multi-lateral agencies in promoting green building concepts in the country. The 'Indian Green Building Council Accredited Professional Examination' (IGBC AP) offered by IGBC is a credential for professionals to participate in green building projects. GRIHA (Green Rating for Integrated Habitat Assessment) is a rating tool that helps people assesses the performance of their building against certain nationally acceptable benchmarks. It evaluates the environmental performance of a building holistically over its entire life cycle, thereby providing a definitive standard for what constitutes a ‘green building’. The rating system, based on accepted energy and environmental principles, seeks to strike a balance between the established practices and emerging concepts, both national and international. It may be mentioned that the GRIHA Council, founded by The Energy and Resources Institute (TERI), New Delhi is an independent platform (registered as a society) for the interaction on scientific and administrative issues related to sustainable habitats in the Indian context.

An investment in green building has the potential to increase the resale value of structure in a competitive market, making it a more welcome addition to the community and demonstrates innovative thinking, bringing up business value in the eyes of prospective clients. In general, the application Green building concept provides energy savings (40-50% less energy compared to conventional building), water saving (20-30% less compared to conventional building), healthier homes & offices, waste minimization, cost saving & economic benefits, enhanced image marketability, enhance the occupancy rates as well as lower capitalization rates potentially reflecting lower investment risk.