

Sustainable Development Through Appropriate Technologies

Vijaya Jayasing Ghadge^{1*}, B. A. Konnur², A. B. Landage²

¹Student, ²Assistant Professor, Department of Civil Engineering, Government College of engineering, Karad, Maharashtra, India

*Corresponding Author: vijaya.ghadge199400@gmail.com

ABSTRACT

The phrase "sustainability" relates to various building operations and various site designs for buildings, and maintenance work which includes repair, and demolition that have the least environmental impact. Structural engineers, building contractors and their number of clients, and designers must work cooperatively throughout the project. One of the most critical topics in the construction industry is sustainable development. Appropriate technology is small-scale technology that is easy to manage on a local level. Due to India's rapid urbanization, the building industry is experiencing a slew of environmental issues. As the demand for houses and other residential units grows, more energy, resources, and raw materials are consumed, resulting in an increase in carbon emissions, which increases carbon content in the air and is hazardous to the environment and human health. The construction industry is in charge of developing, changing, and upgrading humanity's living environment. However, the fundamental issue here is that construction and buildings have major environmental implications, absorbing a significant part of the earth's resources, including soil, energy, raw materials, water, and agricultural land. Considering all the paper discusses areas in building construction where appropriate and modern technology can be effectively employed and where savings in construction cost and energies are significant for long-term sustainability.

Keywords-- Buildings, Construction industry, Raw materials, Resources, Sustainable, Technology

INTRODUCTION

The phrase "sustainability" relates to various building operations and various site

designs for buildings, and maintenance work which includes repair, and demolition that have the least environmental impact. Structural engineers, building contractors and their number of clients, and designers must work cooperatively throughout the project. One of the most critical topics in the construction industry is sustainable development. Appropriate technology is very small-scale technology that is easy to manage on a local level. Due to India's rapid urbanization, the building industry is experiencing a slew of environmental issues. As the demand for houses and other residential units grows, more energy, resources, and raw materials are consumed, resulting in an increase in carbon emissions, which increases the carbon content in the air and is hazardous to the environment and human health. The construction industry is in charge of developing, changing, and upgrading humanity's living environment. However, the fundamental issue here is that the construction of buildings and structures has major environmental implications, absorbing a significant part of the earth's resources, including energy, raw materials, soil, water, and Agricultural land. Overall this paper discusses areas in building construction where appropriate and modern technology can be employed effectively, and where cost-savings in construction and energy are crucial for long-term sustainability [1-3].

SUSTAINABLE TECHNOLOGIES

Development that fulfills present needs without impacting future generations' ability to meet their own is referred to as sustainable development. As India's economy grows and we enter an era of accelerated development, it is more important than ever to create an enabling environment for affordable housing for all. We've recognized throughout the years that technology exists, but that it rarely reaches the general public since we're either unaware of these creative treatments or don't know how to proceed. The

rising cost of living or housing is now well acknowledged. Suitable techniques, as well as cost-effective and environmentally friendly technology in numerous fields of civil construction, will play a significant role in sustainable growth as follows [4]:

- **Indigenous Material Science and Technology:** Bamboo wood, sugar pulp, coconut shell, jute fibers, banana fibers, as well as other natural materials are used in an optimal and advanced application of bioengineering in the production of required qualities in these natural materials.
- **Energy-Efficient Technology:** The purpose of efficient energy use, also referred to as energy efficiency, is to reduce the energy required to supply products as well as provide services. This is done while minimizing the impact of pollution on the environment. This comprises a variety of low-cost systems for greenhouse building energy and natural ventilation. Local material components are used in construction, and renewable solar energy, energy formed by wind, and biogas energy are used, among other things.
- **Disaster Resistance Structures:** Earthquake-resistant structures are built to protect our residences from seismicity to some degree or another. While no structure can be proven to be earthquake-proof, earthquake-resistant construction strives to create structures that outperform their conventional counterparts during seismic waves. This technology includes earthquake-resistant structures made of lightweight materials and moveable structures that can be used as temporary blinds in locations where disaster-affected floating building constructions are positioned near coastal areas.
- **Techniques for Collecting Stormwater:** Water management and conservation from the top of the roof water collection or utilization system collects rainwater from open terrain ground, spaces, parklands, and road pavement and is used for backup water and groundwater or subsurface water recharge in factories and processing plants, such as sugar, paper mills, textiles, and apparel industries, hotels, resorts, etc..
- **Waste Product Solutions:** Waste materials

are processed and converted into useable or high-value items. Trash can be solid waste from various waste disposal plants, sewage treatment units, or waste from the construction industry. This includes recycling aggregates, roadway materials, pipework, tile floorings, and other precast components. Bio-materials composition, factory waste from furniture, plastic trash, and agricultural waste.

- **Price-effective Transportation Solutions:** Poor cost or Low-cost roads in rural and isolated places, temporary provisional and emergency bridges, ropeway systems in remote and mountainous, and interior waterways for transportation of various machines, different types of equipment, products, and passengers, and workers with water cleaning techniques are all used [5].
- There are many uses for bamboo and other valuable trees in undeveloped land. Throughout the world, bamboo is used as a building material, a source of protein, and a raw material. It is also frequently used in creativity, such as bamboo drawing paintings and bamboo handicrafts.. The natural compound bamboo, like wood, has a high strength-to-weight ratio, making it ideal for structural applications.. The strength-to-weight ratio of bamboo is the same as that of wood, and its strength is comparable to that of hard or soft woods.

PREVIOUS RESEARCH WORKS

Ar. Kaanchan M. Patil, Er. Mahendraa S. Patil (2017) "Sustainable Construction Materials & Technology in Context with Sustainable Development." They have studied that in the last two decades, the concept of sustainable development has risen to prominence. This progress is possible because of the use of environmentally friendly building materials and technologies [6].

Bontempi E., Sorrentino G. P. Zanoletti A Alessandri, Depero L. E. C aneschi A (2021). Sustainable Materials and their Contribution to the Sustainable Development Goals (SDGs)"This paper brings attention to a number of issues associated with sustainable materials and encourages researchers to focus study on the Sustainable Development Goals interconnections [7].

Dr. K N Sheth (2016)“Sustainable building materials used in green buildings” They investigated the material efficiency of green materials as well as the environmental philosophy that underpins each of these features [8].

Goncalves A. Martins I (2019) “Sustainability of construction materials and overview” This study presents a survey of materials on the long-term viability of building projects, as well as some instances of established applications, highlighting the challenges of obtaining high-quality data and weighing indicators to aid decision-making [9].

F. A. Rahim, S. A.Muzaffar, N. S. Mohd Yusof, N. Zainon, C. Wang (2014)“Sustainable construction through life cycle costing” The link between life cycle economics and environmentally friendly design is explored in this article. In addition, it discusses how these two elements can be combined to promote sustainability throughout the product lifecycle of construction projects [10].

METHODOLOGY

The purpose of this paper is to study various technologies that contribute to sustainable development. After analyzing the literature, it was found that there is very little research done on the contribution of construction materials to sustainable development. In addition, we must study various appropriate technologies contributing to sustainable development.

CONCLUSION

Building materials that are sustainable and technology that is environmentally friendly should be used effectively and culturally. Sustainable technologies and materials not only lower transportation and production costs while also lowering carbon emissions, but they also create possibilities for community members to earn employment and enhance their skills. Civil engineering is a main key branch of engineering that is accountable for multidimensional growth in the Financial, ethical, and ecological sectors, as well as in the manufacturing and industrial sectors. Furthermore, because of its features that directly assist development activities, civil engineering is the backbone of any country's development. Infrastructure environmental degradation as a result of over-

exploitation of natural resources and rising construction costs have enhanced attention to the creation of price-effective civil engineering materials and procedures, as well as hints at relevant technology As we all know, a new aspect can always be added depending on the personal view of any stakeholder, the data in this study cannot be exhaustive, which is a flaw in the research.

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