**A PROJECT REPORT**

**ON**

“SUSTAINABLE CONSTRUCTION PRACTICE IN BUILDING DESIGN”

## UNDERTAKEN AT

**“MIT School of Distance Education”**

## IN PARTIAL FULFILMENT OF

**“POST GRADUATION IN CONSTRUCTION MANAGEMENT”**

## MIT SCHOOL OF DISTANCE EDUCATION, PUNE.

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# MIT SCHOOL OF DISTANCE EDUCATION PUNE - 411 038

## YEAR 2022-24

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# DECLARATION

I hereby declare that this project report entitled **“SUSTAINABLE CONSTRUCTION PRACTICE IN BUILDING DESIGN”** bonafide record of the project work carried out by me during the academic year **2023-2024**, in fulfillment of the requirements for the award of **“POST GRADUATION IN CONSTRUCTION MANAGEMENT”** of MIT School of Distance Education.

This work has not been undertaken or submitted elsewhere in connection with any other academic course.

**Sign:-**

**Name:- JYOTI SAXENA**

**Student ID: MIT2022D01708**

# ACKNOWLEDGEMENT

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At last, but not least, I am thankful to my Family, my husband Sudhanshu Ranjan, my parents and Friends for their moral support, endurance and encouragement during the course of the project.

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# ABSTRACT

Sustainable construction practice can be defined as design philosophy which focuses on increasing the efficiency of resource use — energy, water, and materials by reducing building impact over human health and our mother earth throughout its life cycle. Our study is based on the objective to find out the major problems faced by people using Sustainable construction practices and factors influencing people for adoption of Sustainable construction practice.

Sustainable construction practice in building design is the need of the hour in the present scenario due the extreme climate changes all over the world. Sustainable construction practice in building design is definitely helping the construction in contrast with the building construction practices adopted earlier. Sustainable construction practice in building design is having major impact in building industry and on climate change. All over the world, the top companies and real estate companies are adopting the sustainable construction practices in building design in all terms by using resources efficiently by using internal recycling, renewable energy sources, recyclable or biodegradable construction materials, and blending in with the local environment, particularly in out-of-town locations. The aims are to reduce the environmental impact to a minimum, and to take human health factors into consideration.

The findings indicate that there is a substantial level of awareness regarding sustainable construction practices in building design among the population of Kota. The majority of respondents acknowledged the awareness regarding the sustainable construction practices in building design. Additionally, the study revealed that the convenience and longtime benefits of sustainable construction practices were the primary drivers for its adoption.

However, despite the high awareness levels, the report highlights a significant proportion of individuals who have yet to embrace sustainable construction practices in building design fully. Factors such as concerns over mindsets, lack of awareness in sustainable practices, and limited knowledge about the long-term losses due to non - environment friendly construction practices were identified as barriers to widespread adoption. The report emphasizes the need for educational initiatives and awareness campaigns to address these concerns and promote the benefits of sustainable construction practices in building design.

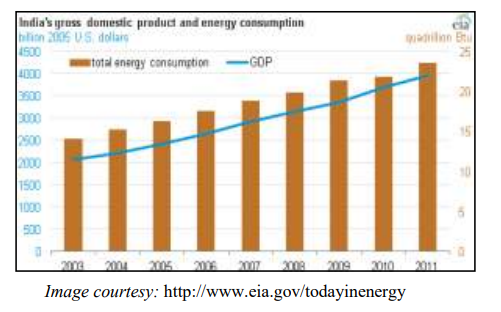
The purpose of this study is to find out the factors of sustainable construction practices in building design, that can impact the city climate as well as on human health. It will help the researchers to look into the overall condition of `sustainable construction practices in building design. To determine the growth direction of sustainable construction practices in building design. Promoting sustainable construction practices in building design and construction industry. Customer perception will be taken into consideration about the sustainable construction practices in building design.

In this research project, a Descriptive research design is used. This method is used because we are interested in exploring gender, age, or occupation disparities in terms of online banking in the population. For conducting this research, a structured questionnaire is prepared and a sample of 65 customers is taken from different banks.

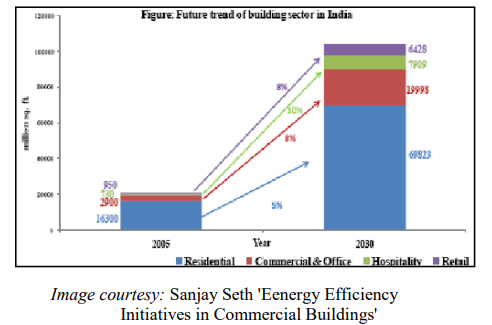
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**CHAPTER 1: INTRODUCTION**

India after China is having the second largest population of the world and is among the 10 fastest growing economies in the world and therefore our energy consumption is expected to continue increasing significantly. Increased energy consumption will lead to more greenhouse gas emissions with serious impacts on the global environment. Environmental degradation and shortage of natural resources are serious issues that the country faces, and the rest of the world dreads. Taking these issues into account it is more of a necessity than a matter of choice that the urbanization process has to address environmental sustainability. Mainly the use of electricity has increased drastically to combat the undesirable impact of the climate. In commercial buildings, the annual energy consumption per square meter of the floor area is in excess of 200kWh with air-conditioning and lighting serving as the two most energy consuming end-use applications within a building. 

It is also estimated that 45% of the total final energy in India is consumed in the sector.



Sustainable architecture posed a new challenge for Indian architecture. With the oil crisis of 1973, the Indian scientific community quickly responded to the issues of sustainable development heralded by the developed world. The emerging green architecture turned towards science and technology to provide solutions for environmental degradation.

The western technology dependent solutions were adopted to solve India’s environmental problems. In this approach energy efficiency was prioritized over all other concerns. The analysis of the passive design features used to control the indoor environment inside the houses present a surprising fact that most of the passive design measures prescribed by the modern designers, energy conservationists,

The advent of technology has revolutionized various sectors, including the banking industry. Electronic banking, or e-banking, has emerged as a convenient and efficient alternative to traditional banking methods. It allows individuals to perform a wide range of financial transactions through digital platforms, such as online banking websites and mobile applications. E-banking offers numerous benefits, including round-the-clock accessibility, enhanced convenience, and streamlined financial management.

In the city of KOTA, sustainable construction practices in building design have gained prominence in recent years. With its bustling economy due to coaching hub for India and demand for accommodation for students all over the India increasing power of real estate sector, Kota represents an ideal setting to explore the awareness and adoption sustainable construction practices in building design among its residents. Understanding the level of awareness and usage patterns related to sustainable construction practices in building design is crucial for institutions and real estate players and stockholder to devise strategies that promote sustainable construction practices in building design and address any barriers that may impede its widespread adoption.

This report aims to examine the awareness and adoption of sustainable construction practices in building design among the people of Kota. By conducting primary research, including surveys and interviews, we sought to collect valuable insights into the knowledge, attitudes, and behaviors of individuals regarding sustainable construction practices in building design. The findings of this study will provide a comprehensive understanding of the current state of sustainable construction practices in building design awareness in Kota and offer recommendations to enhance its adoption.

## OVERVIEW OF WORLD

In 1980, the concept of “sustainable development” took hold, and a few developed countries

had begun widely implementing energy-saving building systems. In 1990, the United Kingdom

introduced the world's first green building standard, followed by formation of the U.S. Green

Building Council in 1993.

### SUSTAINABLE CONSTRUCTION PRACTICES IN BUILDING DESIGN

### IN INDIA

Today, more than half the world’s population lives in cities, a figure that is forecast to rise to 70% by 2050. Cities are engines of economic growth, generating approximately 85% of global GDP. Rapid urbanization and increased consumption have led to economic growth in many parts of the world but have also created unprecedented environmental degradation and socio-economic issues.

As per international commitments, India plans to reduce its energy intensity by 33%–35% by 2030. In this regard, ‘green buildings’ play a crucial role as they are synonymous to both sustainable construction and assured high performance. GRIHA–with its commitment to the intended nationally determined contributions (INDCs)–has been instrumental in promoting good practices and innovative solutions to enhance resource efficiency in the building sector. I am delighted to inform that GRIHA has rated nearly 300 projects, amounting to approximately 71 million ft2 of built-up area with an average reduction of 45% in energy demand, 45%–90% reduction in water demand (depending on the seasonal variation), and up to 60% reduction in waste being sent to the landfills compared to conventional buildings. In the last few decades, green construction technologies, materials, and practices have evolved. Not only have they become environmentally responsible but these also promote resource efficiency throughout the building’s life cycle stages: planning, designing, construction, operation, maintenance, renovation, and demolition LEED -India was launched in 2001 and rates buildings on environmental performance and energy efficiency during the design, construction and operation stages.

Since 2015, the Indian government has launched several effective and flagship programs to achieve the SDGs. Above all, India has always supported the idea of sustainable development by engaging various stakeholders.

Understanding built environment in hot and dry climate Climate is an important aspect of life particularly in areas with hot and dry climate such as state of Rajasthan, where people face variety of problems related to climate especially in modern housing. Traditional built environment of Kota is considered appropriate for both the climate as well as for social conditions. The modern architecture of international style which has dominated the new developments generally considered inappropriate, particularly because it was introduced without consideration for the local climate or for the cultural need of the population. Traditional built environment in Kota have evolved in response to climate, reducing the heat effect of climate conditions.

The main concern of the builders was to modify extremes of air temperature, and to protect the inhabitants from solar radiation and glare as well as from dust. In hot and dry climate, the most significant problems are those caused by solar radiation and UV rays. These can destroy surface finishes, above all coated surfaces of metal sections, metal sheeting and wood surfaces. The great temperature difference of 45oC in summer and cold winter nights with low temperature, impose considerable strain on the construction and material in the form of swelling and contraction. Although the choice of the building material is essentially determined by local availability, their economy, durability and suitability for the particular climate. The means of transporting materials from distant place of production is also an important factor. For many the acceptance of material is related to its status. Vernacular architecture of Hot and Dry Climate of kota has many passive design features. The coolness of the houses on a hot summer afternoon never fails to impress the visitor and makes one wonder how the indigenous builders could create such comfortable buildings without aid of modern scientific knowledge

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### HISTORY

Since that day in 2001 when IGBC was established as part of the Confederation of Indian Industry (CII), I have had the pleasure of witnessing the evolution, growth and spread of the green building movement in India. I am delighted that I continue to be part of this glorious and inspiring journey. Today, IGBC has 1,875 members and the support of 23 local chapters, is playing a catalytic role in spearheading the green building movement in India.

Our first major milestone came in 2003 when the CII-Godrej GBC building in Hyderabad became India’s first platinum-rated green building. It was the greenest building at that point in time and this distinction really marked the start of the green building movement in India.  It was encouraging to see how the Indian construction industry could design its own growth path towards sustainability. What started as one project in 2003, has now grown to over 4,500 IGBC registered projects, amounting to over 4.53 billion sq ft of footprint, spread across five climatic

zones of the country. India is now among the top five countries in the world in terms of largest registered green building footprint, and IGBC represents around 90 per cent of the market share of this registered footprint.

**INITIAL STAGE**

**MID WAY STAGE**

**CURRENT STAGE**

**INITIAL STAGE**

Sustainable construction was defined by Professor C.J. Kibert in 1994 at the 1st International Conference on Sustainable Construction as “the creation and responsible maintenance of a healthy environment, based on resource efficient and ecology principles

In essence, sustainable building should take a triple bottom line approach where economic, social and environmental aspects should be taken into consideration during the entire life cycle of buildings. The accomplishment of a high-performance, low-environmental-impact sustainable buildings can be fulfilled from many aspects including sustainable materials, sustainable operations, sustainable services, and sustainable consumption meaning to incorporate sustainability principles into every part of a building.

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**MID WAY STAGE**

The last decades have witnessed a rapid growth of the construction industry arguably due to the social and economic development. The construction industry has significant impacts on the economy, environment and society. For instance, the construction industry is one of major consumers of resources especially the energy. Energy is the essential input during the entire life cycle of buildings not only during the operation stage but also during the manufacturing of building materials. In China, buildings accounted for nearly 25% of the total primary energy consumption, and this proportion could be expanded to 35% by 2030. Particularly, with the consumption of 40% materials entering the global economy, the construction industry is responsible for 40–50% of the global output of greenhouse gases and the agents of acid rain.

market size of USD 300 billion by 2025. Growing awareness within the industry and from end users has increased the demand for greener products, technologies and buildings. Building on this, CII has launched a green product certification, Green pro, to ensure that green solutions meet our quality standards. Green Pro is based on a lifecycle approach to certifying products, and over 150 products are currently Green Pro certified.

**CURRENT STAGE**

Our focus for the future is on ensuring buildings are as green as possible, hence our commitment to net zero carbon buildings, and to green buildings of different varieties and scales, from offices, homes and schools, to villages, townships and entire cities. We hope that by 2022 – the 75th year of India’s independence – India will be recognised as a global leader in green buildings.

Modern buildings are typically good-sized projects utilizing various kinds of building materials and large quantities of energy, resulting in significant influence on the environment. As a result, the last decades have witnessed a rapid growth of researches on the assessment of buildings across the entire life cycle. Life cycle assessment (LCA) provides a useful tool to serve this purpose by quantifying the environmental impacts and showing the practical reduction measures on assessing the sustainability

In India we have started constructing green buildings since 2003 , has now grown to over 4,500 IGBC registered projects, amounting to over 4.53 billion sq. ft of footprint, spread across five climatic zones of the country. India is now among the top five countries in the world in terms of largest registered green building footprint, and IGBC represents around 90 per cent of the market share of this registered footprint.

Highlighting a clear business case has been instrumental. We have demonstrated that constructing a green building is technically feasible and economically viable. Although the incremental costs are still around 3 to 5 per cent, these additional costs are paid back within two to three years, with a substantial reduction in operational costs. By 2020, we forecast that the construction costs for a green building will be less than a conventional building.

IGBC has launched over 20 rating systems to address different building typologies and national priorities, including energy efficiency, water conservation, the handling of household waste, reduced use of fossil fuels, reduced dependence on the use of virgin materials, and the health and wellbeing of building occupants.

We have also facilitated a market transformation. Most of the products and technologies which we previously had to import are today readily available within our country, with an estimated

Solar passive techniques to mitigate the undesirable impact in hot and dry climate Passive Architecture involves blending conventional architectural principles with solar & wind energy and the inherent properties of building materials to ensure that the interiors remain warm in winter and cool in summer, thus creating a year around comfortable environment. In passive building designs, the passive system is integrated into the building elements and materials. It should be understood that passive architectural design does not necessarily mean the elimination of standard mechanical systems.

In recent designs however, passive systems coupled with high efficiency backup systems greatly reduce the size of the traditional heating or cooling systems and reduce the amount of non-renewable fuels needed to maintain comfortable indoor temperatures. 4.1 Passive techniques and features the first step to achieve passive cooling in a building is to reduce unnecessary thermal loads that might enter it.

Usually, there are two types of thermal loads

1. Exterior loads due to the climate.

2. Internal loads due to people, appliances, cooking, bathing, lights etc.

Proper zoning of different components and local ventilation of major heat sources can reduce the overall impact of internally generated heat loads.

Considerable factors to mitigate impact of heat loads:

1. Orientation and shape of building- Resist heat gain, Decrease exposed surface area

2. Insulation of building envelope-Increase thermal resistance

3. Massive structure - Increase thermal capacity (Time lag)

4. Air locks/ lobbies/balconies/verandahs- Increase buffer spaces

5. Weather stripping and scheduling air changes, Decrease air exchange rate (Ventilation during day time)

6. External surfaces protected by overhangs Fins and trees- Increase shading

7. Pale color, glazed China mosaic tiles etc.- Increase surface reflectivity

8. Provide windows/exhausts - Ventilation of appliances, Promote heat loss

9. Courtyards/wind towers/arrangement of openings - Increase air exchange rate,

**Urban Climate** The air temperatures in densely built urban areas are often higher than the temperatures of the surrounding countryside. This is due to rapid urbanization and industrialization. The term “urban heat island” refers to increased surface temperatures in some pockets of a city, caused by an ever-changing microclimate.

The difference between the maximum city temperature (measured at the city center) and the surrounding countryside is the urban heat-island intensity. An urban heat island study was carried out in Pune, Mumbai, Kolkata, Delhi, Vishakhapatnam, Vijayawada, Bhopal and Chennai. It is seen that; the heat island intensity is greatest in Pune (about 10 °C) and lowest in Vishakhapatnam (about 0.6°C).

In the metropolitan cities of Mumbai, New Delhi, Chennai and Kolkata, the corresponding values are 9.5, 6.0, 4.0 and 4.0oC respectively. Clearly, the values are quite high. The density of the built environment and the extent of tree cover or vegetation primarily affect the heat-island intensity. Pollution and heat due to vehicular traffic, industrialization and human activities are other contributing factors Normally, the central business district (CBD) or the center of city experiences higher temperatures than the other parts.

This is because the CBD mainly consists of concrete buildings and asphalted roads, which heat up very quickly due to radiation from the sun. Most of this heat is stored and released very slowly, sometimes even up to the night. This phenomenon does not allow the daily minimum temperature to become too low. Though it may be a welcome phenomenon in cold regions during winters, it makes life unbearable for people in the hot regions. Thus, in tropical climates, the provision of sufficient ventilation and spacing between buildings is required to allow the accumulated heat to escape to the atmosphere easily.

Street patterns and urban blocks can be oriented and sized to incorporate concerns of light, sun, and shade according to the dictates of the climate. For example, the densely built areas produce, store and retain more heat than low-density areas. Thus, the temperature differential between urban areas and the

# CHAPTER 2: ORGANIZATIONAL PROFILE

MIT School of Distance Education (MITSDE) is an esteemed institution dedicated to providing quality distance education in various fields of study. Established under the flagship of the prestigious MIT Group of Institutions, MITSDE has been at the forefront of delivering industry-relevant education through distance learning programs. With a focus on flexibility, accessibility, and excellence, MITSDE aims to empower learners to achieve their educational and professional goals.

Mission:

The mission of MITSDE is to provide affordable and flexible education through innovative distance learning methodologies. It strives to bridge the gap between academic knowledge and practical skills, enabling students to excel in their chosen fields and contribute to society.

Accreditations and Recognitions:

MITSDE is recognized and accredited by several esteemed organizations, ensuring the quality and credibility of its programs. Some of its accreditations and recognitions include:

* Distance Education Council (DEC): MITSDE is approved by the Distance Education Bureau of the University Grants Commission (UGC) and is a member of DEC.
* All India Council for Technical Education (AICTE): MITSDE is recognized by AICTE, which ensures the quality and standards of its technical programs.
* Association of Indian Universities (AIU): MITSDE is a member of AIU, which validates the equivalence of its programs with traditional degrees.

Programs Offered:

MITSDE offers a diverse range of distance learning programs across various disciplines, catering to the educational needs of working professionals, students, and individuals seeking career advancement. The programs include:

1. Postgraduate Diploma in Management (PGDM): Specializations in areas such as Marketing, Finance, Human Resource, Operations, IT, and Supply Chain Management.
2. Postgraduate Diploma in Business Administration (PGDBA): Specializations in Finance, Marketing, HR, Operations, and IT.
3. Postgraduate Diploma in Infrastructure Management (PGDIM): Focuses on the management of infrastructure projects, construction, and urban development.
4. Postgraduate Diploma in Project Management (PGDPM): Equips students with the skills to effectively manage and execute projects in various industries.
5. Postgraduate Diploma in Retail Management (PGDRM): Focuses on retail operations, merchandising, supply chain management, and customer relationship management.
6. Postgraduate Diploma in Financial Management (PGDFM): Concentrates on financial planning, analysis, investment, and risk management.

Learning Methodology:

MITSDE employs a robust and technology-driven learning methodology to ensure an engaging and interactive educational experience for its students. The key features of its learning approach include:

1. Self-Learning Material: MITSDE provides comprehensive study material in print and digital formats, enabling students to study at their own pace.
2. Online Learning: Leveraging advanced technologies, MITSDE offers online lectures, webinars, e-learning platforms, and interactive sessions to facilitate student-teacher interaction and collaborative learning.
3. Industry-Relevant Curriculum: The curriculum is designed to align with industry requirements and to impart practical skills and knowledge to students, ensuring their readiness for the professional world.
4. Student Support: MITSDE offers dedicated academic support to students through faculty interaction, doubt-solving sessions, online discussion forums, and personalized guidance.

Conclusion:

MIT School of Distance Education (MITSDE) stands as a prominent institution in the field of distance education, committed to providing quality programs and holistic learning experiences to students. With its strong emphasis on flexibility, industry relevance, and student support, MITSDE continues to empower learners, equipping them with the knowledge and skills needed to excel in their careers and contribute to society's growth.

It is contributing to the industrial, economic, and social growth of society for over a quarter of a century, Maharashtra Academy of Engineering Education and Research (MAEER)’s MIT Group of Institutions has helped realize the dreams and aspirations of thousands of students. The group has spread its wings across Maharashtra with campuses in Kothrud, Alandi, and Loni- Kalbhor within Pune, along with Latur, Talegaon, Ambejogai, and Pandharpur.

Being the brainchild of its visionary founder, Prof. Vishwanath D. Karad, MAEER established in 1983, managed to craft a niche position for being a one-of-its-kind undertaking that focused on value-based education.

# CHAPTER 3: PROJECT OBJECTIVES AND SCOPE

### OBJECTIVE OF STUDY

### The objectives of the report on “sustainable construction practices in building design

### in India” are as follows:

1. Assess the level of awareness: The report aims to determine the extent to which the people of Kota are aware of sustainable construction practices in building design. It seeks to identify the knowledge and understanding of different construction materials and their functionalities among the buildings.
2. Analyze adoption patterns: The report aims to analyze the adoption patterns towards selection of sustainable construction product. It seeks to understand the extent to which individuals have embraced sustainable construction practices as a preferred mode of conducting financial transactions.
3. Identify factors influencing adoption: The report aims to identify the factors that influence the adoption or resistance towards selection of sustainable product which help in sustainable construction practice in Kota. It seeks to explore the barriers and challenges individuals face when considering the use of sustainable construction practice.
4. Examine attitudes and perceptions: The report aims to examine the attitudes, perceptions, and concerns of the people of Kota regarding sustainable. It seeks to understand their views on the strength, cost effectiveness, reliability, and convenience of building construction services.
5. Investigate demographic influences: The report aims to investigate how demographic factors, such as income level, and educational background, influence sustainable construction practice. It seeks to identify any variations in attitudes and behaviors across different demographic segments.
6. Provide recommendations: Based on the findings of the study, the report aims to provide recommendations to enhance sustainable building product awareness and adoption in Kota. It seeks to suggest strategies that real sectors can implement to address barriers and promote the benefits of sustainable construction practices.

Overall, the objectives of the report aim to shed light on the current recommendations for stakeholders in the real sector and policymakers to promote sustainable construction practice effectively in sustainable construction practice and adoption in Kota, providing valuable insights and.

### MEANING OF RESEARCH

Research refers to the systematic investigation and study conducted to gather information, analyze data, and gain insights about the level of awareness and understanding of the sustainable construction material and its impact over environmental impact among the people of Kota.

Research in this report aims to explore and understand the knowledge, perceptions, attitudes, and behaviors of individuals in Kota regarding the sustainable construction material. It involves gathering relevant data, analyzing it using appropriate methods and techniques, and interpreting the findings to draw meaningful conclusions.

The purpose of the research in this report is to assess the current state of the sustainable construction material in building design and its awareness among the people of Kota, identify any gaps or misconceptions, and provide insights and recommendations to enhance awareness and adoption of the sustainable construction materials.

The research process may involve various steps, such as:

1. Defining the research objectives: Clearly stating the specific goals and objectives of the research, such as understanding the level of the sustainable construction material awareness, identifying factors influencing adoption, or evaluating customer satisfaction with old building construction materials in building design.
2. Designing the research methodology: Determining the appropriate research design and methodology, which could include surveys, interviews, focus groups, or a combination of methods. Selecting a representative sample of participants from the population of Kota to gather data.
3. Data collection: Collecting primary data through surveys or interviews, or gathering secondary data from existing sources such as reports, studies, or literature related to the sustainable construction material awareness and usage.
4. Data analysis: Analyzing the collected data using statistical techniques, qualitative analysis, or other relevant methods to identify patterns, trends, and insights related to the sustainable construction practices in building design its awareness and usage in Kota.
5. Interpretation and conclusions: Interpreting the findings based on the analysis and drawing meaningful conclusions about the level of the sustainable construction material awareness, identifying factors influencing awareness, usage patterns, challenges, and potential opportunities for improvement.
6. Recommendations: Providing recommendations based on the research findings to enhance the uses of the sustainable construction material in building design and its awareness among the people of Kota. These recommendations could include awareness campaigns, educational initiatives, improvements in banking infrastructure, or targeted marketing strategies.

By conducting research, the report aims to contribute valuable insights and recommendations that can help stakeholders, such as builder, contractors, planner, architects, policymakers, and individuals, to enhance e the sustainable construction material awareness and promote its benefits in Kota.

### NEED OF THE STUDY

The need for the study on “sustainable construction practice in Building design Report” arises from several factors:

1. Assessing Current Awareness Levels: The study aims to evaluate the existing level of awareness among the people of Kota regarding services. This information is crucial to understanding the extent to which people are aware of the benefits, features, and availability of sustainable construction practice in Building design options in the region.
2. Identifying Knowledge Gaps: The study helps identify any gaps in knowledge or misconceptions about sustainable construction practice in Building design among the people of Kota. By understanding these gaps, the report can provide insights into areas where educational initiatives or awareness campaigns may be needed to address the specific concerns or misconceptions.
3. Understanding Barriers to Adoption: The research aims to identify the factors that hinder people from adopting sustainable construction practice in Building design Report in Kota. This may include concerns related to limited understanding of the climatology, space scarcity or influential preferences for western methods of building construction and design. Understanding these barriers is crucial to developing strategies that can overcome them and promote wider uses of sustainable construction practices.
4. Improving Customer Experience: Understanding the long-lasting benefits of sustainable construction practices in building design cause it’s not only about the right selection of product it’s about the process, the orientation, and techniques which are inherent part of sustainable construction practices.

Overall, the study on sustainable construction practice in Building design awareness among the people of Kota is necessary to identify gaps, understand barriers, and develop strategies that can promote wider adoption of sustainable construction practice in Building design. By addressing these needs, the report can contribute to the growth and development of sustainable construction practice in Building design in the region, improve awareness, and enhance the overall building technology for individuals in Kota.

### SCOPE OF THE STUDY

The scope of the report on “sustainable construction practice in Building design Report” encompasses the following aspects:

1. Geographic Scope: The report focuses specifically on the city of Kota, RAJASTHAN, India to gather insights and analyze the sustainable construction practice in Building design awareness and adoption patterns among the people residing in KOTA.

### Primary Data:

Questionnaire was used to collect primary data from respondents.

#### Secondary Data:

Secondary Data was collected through Internet, banking related books and journals.

### SAMPLE DESIGN AND SIZE

In this research project Descriptive research design is used. Judgmental and Convenience sampling methods will be used to get the information about in sustainable construction practice. This method is used because we are interested in exploring gender, age, or occupation disparities, awareness towards the materials and technology along with economic condition in terms of adopting sustainable construction practice in building design in the population. For conducting this research, a structured questionnaire is prepared and a sample of 50 customers is taken from different contractors.

### TOOLS AND TECHNIQUES OF ANALYSIS

The various tools and techniques of analysis to examine and interpret the collected data. Here are some commonly used tools and techniques:

1. Survey Questionnaires: Designing and administering survey questionnaires can help gather quantitative data from a representative sample of individuals in Kota. The survey can include questions related to sustainable construction practice in Building design, usage patterns, preferences, and satisfaction levels. Statistical analysis can be applied to analyze the survey responses, such as calculating percentages, averages, correlations, and conducting inferential analysis.
2. Interviews: Conducting structured or semi-structured interviews with selected participants can provide qualitative insights into their experiences, perceptions, and attitudes towards sustainable construction practice in Building design. Thematic analysis or content analysis can be employed to identify recurring themes, patterns, and narratives within the interview data.
3. Focus Groups: Organizing focus group discussions with small groups of individuals can facilitate interactive discussions and generate in-depth insights into sustainable construction practice in Building design Report awareness and perceptions. The data from focus groups can be transcribed, coded, and thematically analyzed to identify key themes and perspectives.
4. Data Visualization: Presenting the findings through visual representations, such as charts, graphs, and diagrams, can make complex data more accessible and understandable. Visualizations can help illustrate trends, patterns, and comparisons in sustainable construction

practice in Building design and usage among different segments of the population.

1. Statistical Analysis: Utilizing statistical analysis techniques, such as descriptive statistics, chi-square tests, t-tests, or regression analysis, can provide quantitative insights into the relationship between variables and identify factors influencing sustainable construction practice in Building design awareness and adoption. Statistical software like SPSS, Excel, or R can be used for data analysis.
2. Comparative Analysis: Comparing the findings of the study with existing research, industry reports, or national-level data on sustainable construction practice in Building design awareness and adoption can provide contextual insights. This analysis can help identify how the sustainable construction practice in Building design landscape in Kota compares to other regions or national averages.
3. Content Analysis: Analyzing relevant documents, reports, websites, and social media content related to sustainable construction practice in Building design Report and activities in Kota can provide additional insights. Content analysis techniques can be applied to identify common themes, sentiments, and emerging trends in the discourse around e-banking.
4. Qualitative Coding: Applying coding techniques to qualitative data, such as interview transcripts or focus group discussions, can help categorize and analyze the data systematically. This process involves assigning labels or codes to different segments of the data, identifying recurring patterns, and extracting meaningful insights.

The selection of specific tools and techniques of analysis will depend on the research objectives, the nature of the data collected, and the available resources. Using a combination of quantitative and qualitative analysis methods can provide a comprehensive understanding of e-banking awareness among the people of Ahmedabad.

### LIMITATIONS OF STUDY

While conducting a study on " sustainable construction practice in Building design Report Among People at Kota," it is important to acknowledge certain limitations that may impact the research and its findings. Some potential limitations of the study could include:

1. Sample Size and Representation: The study's findings may be influenced by the size and representativeness of the sample. If the sample size is small or not diverse enough, it may not accurately reflect the overall population of Kota. This could affect the generalizability of the findings to the entire population.
2. Self-Reported Data: The study may rely on self-reported data obtained through surveys or interviews. This type of data is subjective and could be subject to biases, memory recall issues, or social desirability bias. Participants may provide responses that they perceive as more socially acceptable or desirable, potentially affecting the accuracy of the findings.
3. Non-Response Bias: There is a possibility of non-response bias, where certain individuals or groups may be less likely to participate in the study. This could introduce bias and affect the representativeness of the sample.
4. Limited Scope: The study's scope may be limited to assessing awareness and adoption of sustainable construction practice in Building design without exploring other relevant factors

that could influence society attitudes and behaviors. Factors such as cultural norms, personal

preferences, or individual circumstances may not be thoroughly examined, potentially limiting the depth of understanding.

1. Time Constraints: The study's timeframe may impose constraints on data collection and analysis. This could limit the ability to capture changes in awareness and adoption levels over an extended period or account for potential fluctuations due to external factors.
2. Lack of Control: As a non-experimental study, there may be limitations in controlling external variables that could impact sustainable construction practice in Building design Report and its adoption. Factors such as media influence, marketing campaigns, or economic conditions may have an impact that cannot be directly controlled or measured.

Potential Response Bias: The study's findings may be influenced by response bias if participants provide answers, they believe researchers expect or if they have a vested interest in promoting or downplaying e-banking awareness.

It is important to acknowledge and address these limitations when interpreting the findings of the study. While efforts are made to mitigate these limitations, they should be taken into account to provide a comprehensive and accurate understanding of e-banking awareness among the people of Ahmedabad.

* + Time Constraints.
  + Customer preferences of a particular construction technique has not been dictated.
  + Security and privacy aspects are major issues in the E-banking transaction. Various sites are not properly locked to ensure whether customer’s money is safe in the cyber world or not.

### HISTORY OF SUSTAINABLE CONSTRUCTION PRACTICE IN BUILDING DESIGN

Sustainable construction means building with renewable and recyclable resources and materials. During construction projects, care must be taken to reduce waste and energy consumption where possible and protect the natural environment around the site

Sustainable building design minimizes environmental impact while enhancing efficiency and sustainability in using materials, energy, and space. This approach champions the creation, operation, and decommissioning of buildings in ways that contribute positively to their surroundings and to the health of those who occupy them. It also emphasizes energy efficiency by integrating renewable energy sources such as solar, wind, and geothermal. Water conservation is another cornerstone achieved via innovative rainwater harvesting systems and greywater reuse. Moreover, sustainable design involves carefully selecting recyclable building materials that have a low environmental footprint and are durable over time. Buildings can achieve remarkable sustainability and efficiency by embedding these elements into the design process from the beginning.

**INTEGRATING SUSTAINABILITY IN OUR DESIGN METHODS**

The transition towards sustainable construction methods marks a significant paradigm shift in planning, designing, and constructing buildings. This evolution in construction philosophy, incorporating modular construction techniques and an emphasis on reducing waste and shortening construction timelines, is evident in various architectural styles. In general, we’ve made the shift toward sustainable practices and integrated these ideals into our design principles.

Adopting green practices, our projects go beyond looking good to also being good for the planet. We carefully choose environmentally friendly materials, aim for energy savings and plan spaces to make the most of natural light. This way, we reduce our impact on the environment while making the places we create more enjoyable for everyone.

Green certifications, such as LEED, serve as a guiding framework for these efforts, providing benchmarks and validation for environmental stewardship. Moreover, the integration of innovative technologies and the Internet of Things (IoT) into construction processes, optimizes energy consumption, reduces emissions, and enhances overall building performance, leading to smarter, more sustainable building solutions.

**THE BENEFITS OF ECO-FRIENDLY DESIGN**

**HEALTHIER LIVES WITH GREEN CONSTRUCTION**

The move towards eco-friendly construction aims to create healthier living and working spaces.By prioritizing aspects such as indoor air quality and natural lighting, green buildings significantly enhance the well-being of their occupants. Advanced ventilation systems and choosing non-toxic, low-emitting materials reduce harmful pollutants, ensuring a healthier indoor climate. This focus on health and wellness is a testament to the profound impact that building design and construction can have on human health.

**GREEN BUILDS CUT WASTE**

One of the hallmark features of sustainable construction is its emphasis on waste reduction across all stages of the building lifecycle. From meticulously planning material usage to recycling construction waste, each step in the process is designed to minimize the environmental footprint of building activities. This approach conserves resources and sets a precedent for responsible construction practices that can be replicated across the industry.

**ECO-CONSTRUCTION BOOSTS ECONOMY**

The economic implications of green construction extend beyond the direct benefits of energy savings and operational efficiencies. The sector catalyses economic growth, creating new job opportunities in green design, construction, and maintenance. This economic stimulation is complemented by the environmental benefits of reduced resource consumption and lower carbon emissions, illustrating the symbiotic relationship between ecological sustainability and economic vitality. A win-win!

**COST-SAVING GREEN TECHNIQUES**

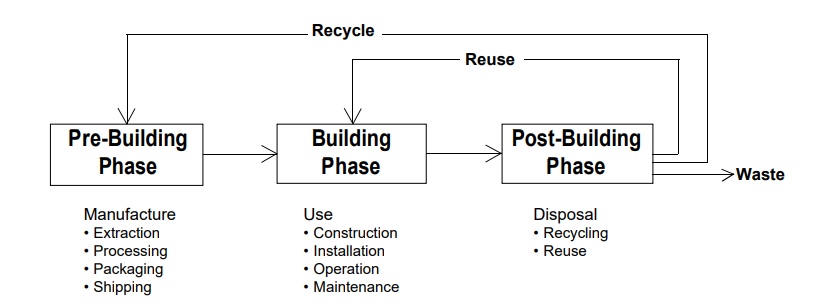
Although initial investment costs for green buildings may exceed those of conventional constructions, the long-term financial benefits are substantial. Green buildings typically incur lower energy costs, reduced water bills, and diminished maintenance expenses, contributing to significant savings over the building’s lifespan. Furthermore, green building practices often increase property values, offering tangible financial incentives for developers and owners alike.

**MATERIAL COST DROPS IN ECO-BUILDING**

growing demand for sustainable building materials has decreased their costs, making green construction more accessible and affordable. This trend towards cost reduction facilitates a broader adoption of eco-friendly materials, drives innovation in the industry, and encourages builders and architects to incorporate more of these sustainable practices without compromising financial viability.

**sustainable Construction Material and building practices**

1. **pre building 2) building phase 3) post building phase**

****

The **Pre-Building Phase** describes the production and delivery process of a material This includes discovering raw materials in nature as well as extracting, manufacturing, packaging, this phase has the most potential for causing environmental damage. Understanding the environmental impacts in the pre-building phase will lead to the wise selection of building materials. Raw material procurement methods, the manufacturing process itself, and the distance from the manufacturing location to the building site all have environmental consequences. An awareness of the origins of building materials is crucial to an understanding of their collective environmental impact when expressed in the form of a building

The **building phase** Building Phase the Building Phase refers to a building material’s useful life. This phase begins at the point of the material’s assembly into a structure, includes the maintenance and repair of the material, and extends throughout the life of the material within or as part of the building. Construction: The material waste generated on a building construction site can be considerable. The selection of building materials for reduced construction waste, and waste that can be recycled, is critical in this phase of the building life cycle. Use/Maintenance: Long-term exposure to certain building materials may be hazardous to the health of a building’s occupants. Even with a growing awareness of the environmental health issues concerning exposure to certain products, there is little emphasis in practice or schools on choosing materials based on their potential for outgassing hazardous chemicals, requiring frequent maintenance with such chemicals, or requiring frequent replacements that perpetuate the exposure cycle

**Post-Building Phase** the Post-Building Phase refers to the building materials when their usefulness in a building has expired. At this point, a material may be reused in its entirety, have its components recycled back into other products, or be discarded. From the perspective of the designer, perhaps the least considered and least understood phase of the building life cycle occurs when the building or material’s useful life has been exhausted. The demolition of buildings and disposal of the resulting waste has a high environmental cost. Degradable materials may produce toxic waste, alone or in combination with other materials. Inert materials consume increasingly scarce landfill space. The adaptive reuse of an existing structure conserves the energy that went into its materials and construction. The energy embodied in the construction of the building itself and the production of these materials will be wasted if these “resources” are not properly utilized

**GREEN BUILDING: SUSTAINABLE MATERIALS GUIDE**

Choosing the right materials is crucial for construction projects’ environmental impact and long-term sustainability. Sustainable building materials stand out due to their renewability, minimal energy consumption in production (low embodied energy), and their potential for recycling or repurposing once they reach the end of their useful life. Among the preferred options are fast-growing resources such as bamboo, known for its strength and versatility; materials containing recycled content like steel, which reduces the demand for virgin resources; and reclaimed materials like wood, which preserve forests and add unique aesthetic value to buildings. These eco-friendly choices help lessen the ecological footprint of construction by minimizing waste and energy use, thereby supporting the creation of buildings that are not only healthier for their occupants but also more efficient in terms of energy consumption. The adoption of such materials is a testament to the construction industry’s commitment to environmental responsibility and its role in promoting sustainability.

**WHY SUSTAINABILITY MATTERS IN CONSTRUCTION**

Generally speaking, green buildings look at the sustainability of four key design areas:

* Selection of righteous Materials
* Energy efficient
* Water saving
* Health conscious

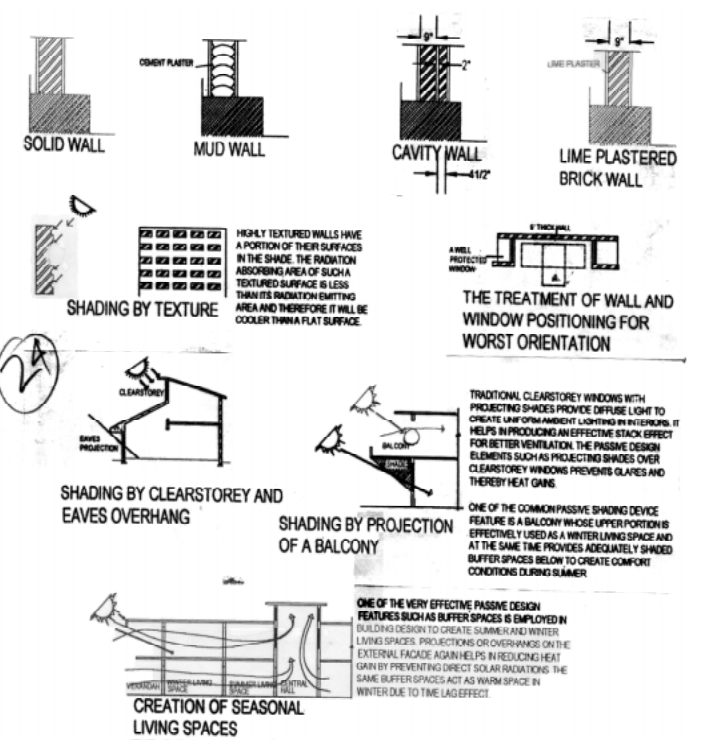
The idea of using solar energy to heat and cool our buildings is not new. For centuries man has made use of sun is energy. In early days sun was used to temper the indoor climates. The earth’s climate is dependent on solar energy. Earlier, man was aware of the advantages of finding a cave or placing wall openings in the direction of the sun is path to capture its warmth during winter days and the unique ability of certain materials to retain sun is warmth and release it later after the sun had set. Therefore, the designs, materials and orientation that exploited the natural energy flows around the inhabitants were chosen. Basic form and material were carefully refined to introduce solar heat or to keep out the sun as per requirement. Man, continually explored new avenues of harnessing solar energy for the service of mankind. It is only during the recent times that these essential principles of design set forth in the rich heritage of ancient architecture have been neglected. Despite the increased sophistication and reliability of solar powered devices, none of the early applications of solar energy survived competition with the emerging use of cheaper fossil fuels. Although solar energy was free and readily available, the capital investment was very high. In recent years, interest in making use of energy from the sun has accelerated enormously. This problem is: how to convert the energy at reasonable cost into a reliable usable form for he

According to the [UN Environmental Programme](http://www.unep.org/), the construction industry alone contributes to 37% of global carbon emissions and resource depletion. By embracing sustainable building practices, the industry can mitigate its environmental impact, foster biodiversity, and contribute positively to the global effort against climate change. This commitment to sustainability is a response to environmental challenges and an opportunity to redefine the industry’s role in building a sustainable future.

**NEED FOR PASSIVE DESIGN** India has different climatic conditions ranging from extremely hot conditions to severely cold conditions. Energy Dr Anupama Sharma and Shri K K Dhote are with the Department of Architecture and Planning, Maulana Azad National Institute of Technology, Bhopal and Shri R Tiwari is a practicing Architect at Jaipur. This paper was presented and discussed at the Eighteenth National Convention of Architectural Engineers held at Jaipur during October 17-18, 2002. availability is scarce and people have to protect themselves from these extremities of the climate in a natural way. Traditional architecture exhibits variety of building design suited to the respective climatic conditions. The month wise climatic data available for 233 stations spread over the whole country has been analyzed by the CBRI, Roorkee. The various climatic zones thus determined have been delineated on the map of the country. The various stations have been categorized under one or the other climatic zone if their climate conformed for six or more months, otherwise it is placed under the composite zone. PASSIVE TECHNIQUES AND FEATURES The first step to achieve passive cooling in a building is to reduce unnecessary thermal loads that might enter it. Usually, there are two types of thermal loads

1. Exterior loads due to the climate heating and cooling of buildings.
2. Internal loads due to people, appliances, cooking, bathing, lights etc.

**Fig-1**



Heat gain prevention technique through commonly used passive shading device features such as : projections, balconies, buffer spaces etc

**PASSIVE TECHNIQUES IN PRACTICES**

Depending on the weather, the thermal load enters into a building in three major ways:

(1) Penetration of direct beam sunlight.

(2) Conduction of heat through walls, roofs etc.

(3) Infiltration of outside air.

## 

## Passive technique in heat preventions

## Fig-2

## 

### ADVANTAGE & DISADVANTAGE OF SUSTAINABLE CONSTRUCTION PRACTICE IN BUILDING DESIGN

**ADVANTAGES**

**A. Durability and Low Maintenance**

The main and very important advantage of sustainable construction practice in building design is the material used which is more durable than the traditional one’s they require less maintenance it means the buildings made out of these materials shows higher strength towards the weather disparity and they last longer and require less maintenance which ultimately save money I of building owner’s in long run and reduce waste created in replacing old materials over the times due to bad performance of materials.

**B. Energy Efficiency**

One among the many advantages of sustainable building materials is that they are very much energy efficient than traditional materials. Sustainable building materials reduce heat loss, keeping buildings cooler in the summer and warmer in the winter, which can help reduce energy costs. Additionally, many sustainable building materials are made from recycled or renewable resources, which can help reduce the amount of waste created during construction.

1)Passive design technique

2)Active design technique

**C. Improved Indoor Air Quality**

Finally, using sustainable building materials can also help improve indoor air quality. Many traditional building materials contain volatile organic compounds (VOCs) that can be released into the air and cause health problems. Sustainable building materials are often free of VOCs and other harmful chemicals, making them a healthier option for indoor air quality, thus maintaining a good [quality of life](https://nationwideconstruction.com/eco-friendly-construction-8-advantages-of-green-building/) for the occupants.

**Impact on the Environment**

**A. Reduction of Carbon Footprint**

[Green buildings](https://www.constructionexec.com/article/ten-benefits-of-sustainable-construction) help reduce the carbon footprint of a construction project. Sustainable materials are often made from renewable resources, which means they require less energy to produce than traditional materials. This can help reduce the number of [greenhouse gas emissions](https://www.wallbarn.com/benefits-sustainable-building-materials/) into the atmosphere, which is essential for combating climate change.

**B. Reduced Energy Consumption**

Green construction, otherwise known as sustainable building can help reduce energy consumption during the construction process. Sustainable materials are often lighter and easier to transport than traditional materials, which can reduce the amount of fuel needed for transportation. Additionally, many sustainable building materials require less energy to produce than traditional raw materials, which can further reduce energy consumption.

**C. Reduced Waste during Construction**

Using [eco-friendly building materials](https://www.knaufnorthamerica.com/en-us/blog/4-reasons-to-consider-eco-friendly-building) can help reduce the amount of waste created during construction. Sustainable building materials are often made from recycled or renewable resources, which means that less new material needs to be produced. Additionally, many sustainable building materials are designed to last longer and require less maintenance than traditional materials, which can further reduce the amount of waste created over time, by demolition debris. By using safer materials, we can help reduce our environmental impact and create a more sustainable future.

**DISADVANTAGES OF SUSTAINABLE CONSTRUCTION PRACTICE IN**

### BUILDING DESIGN

Possible disadvantages include:

* The initial building cost, which can be more expensive than conventional buildings.
* Funding for projects from banks hard to get since a lot of the technology and methods are still relatively new.
* Green construction materials are not always as readily available as traditional materials
* Unavailability of skilled labour for the green construction practice is the main disadvantage among few others as nobody care about the benefits of mother earth over there personal ones.so finding skilled artisan and service provider is a hard task.
* Green building construction can be more complex in nature, more time consuming and relatively more expensive ones.
* One need to ensure about the material listed under ‘green’ level as few of them are really not green as they called themselves. .one need to do research to ensure that you are truly making an impact.

**Cooling and Heating Techniques using Thermal Mass**

Thermal Storage Thermal capacity effects in the materials result in time delay as well as damping of the parameters in the environment. As a result temperature differences exist between the materials and the environment around them and this effect can be utilized for space cooling.

Building Elements All building elements such as walls, roof and floor can be used for thermal storage. Creating a flow of fluid through the storage media can increase the efficiency of thermal storage. Additional thermal storage can be created by construction of rock bed storage. Conventional Walls and Ceilings Thermal storage efficiency of a building element depends on the heat storage capacity of various material layers of the building element, the order in which these layers are arranged and also on the fact whether the material is in the steady state or in the transient state.

For example, a hanging acoustic ceiling of mineral wool below the roof acts as a lightweight building element for the thermal steady state conditions. During the transient state, however, the concrete room acts as a thermal storage system with appreciable time delay. A larger thermal storage capacity in any case leads to smoothening of the room temperature fluctuation and delays room temperature changes.

The thermal performance of a building during the summer time is positively influenced by external as well as internal building elements. Building Elements with Air Flow The heat storage capacity of building elements can be increased by having some tubes in the massive ceiling and cooling it during the night by forcing air flow.

The Vary Therma Wall Controlling the air movement in magnitude and direction gives rise to wall components with varying thermal resistance. Such a system can be used for mild winter heating and summer cooling for mixed climate as in Delhi.

The external wall components are made of light material like aluminum or wood, while the internal component is made of brick (or concrete) wall. The flow of air is controlled into the room or to the ambient by providing proper vents in the interior wall. During the summer daytime, the wall provides effective air insulation and during the night the cool ambient air comes in contact with the warm brick wall and gets heated establishing a natural flow of air.

This air movement helps in quick removal of the heat flux. During winter, the vents are opened during the day into the room for supplying warm air and all vents are kept closed during the night time, thus providing an air insulation which minimizes heat losses to the ambient.

Vary them wall deriving its name from the variable resistance can be operated in three modes:

i)No flow of air in the gap thus effectively reducing the system to an air gap within the wall;

ii) Continuous flow of air into the room or to the atmosphere maintained by natural or forced convection; and

(iii) No air flow during the day or night and creating an airflow by opening the vents during night or day time depending on the weather conditions.

**CONCLUSION** The concept of Thermal mass in buildings was used by ancestors. Today it is thought of as a means of conserving energy. The foregoing description of vernacular architecture if examined for recurrent forms, materials or life patterns may lead to newer ideas

# CHAPTER 4: DATA ANALYSIS AND INTERPRETATION

**AGE**

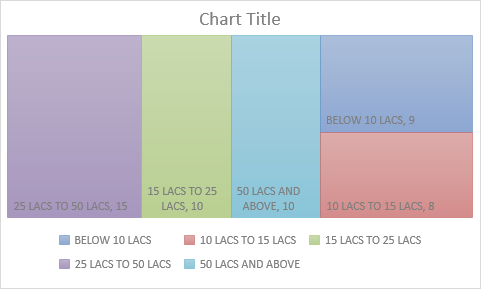
we have got 100% response between the age from 25-57 which include mainly students, employees, and businessmen. which means the majority population using e- banking includes between this age group.

**TYPE**

**OCCUPATION**

Majority of the house owners are there this means they are individuals who are constructing either their own houses or hostel’s thus might be using sustainable construction practices.

**BUDGET**



Majority of the income group lies between 25 lakh and 50 lakh this means they are business persons thus might be using sustainable construction practices.

**QUALIFICATION**

50 RESPONCES

Majority of the group candidates are graduates or undergraduates this means they might be aware of new technologies and their benefits present in the market thus might be using sustainable construction practices.

**AREA OF PROJECTS**

Majority of projects are proposed either in Kunhari area or Jawaher Nagar thus, we can say that these areas are having potential for future growth and will be prospects for sustainable construction practices.

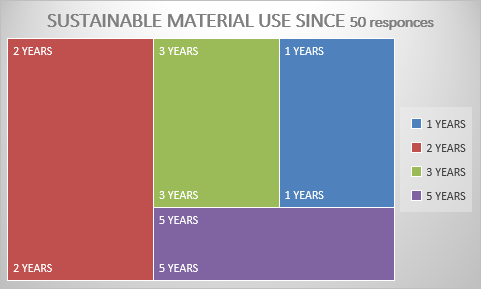
**SUSTAINABLE CONSTRUCTION MATERIAL USES**

From data of 50 there are 24 persons using sustainable construction practices so its clearly

shown through data that in coming years this practice of using sustainable construction

material will increase rapidly

**SUSTAINABLE CONSTRUCTION PRACTICE IN BUILDING DESIGN SINCE?**



Here we can see that a maximum of 20 people has been using sustainable construction material in building design for more than 2 years.

**ANY** **DISCOMFORT USING THESE MATERIAL?**

As sustainable construction practice in building design is still evolving it still faces some problems in terms of availability and cost thus maximum people have voted for sometimes.

**ARE YOU SATISFIED WITH IT.**

**DOES USES OF SUSTAINABLE CONSTRUCTION PRACTICE MADE YOUR EASIER?**

**IS IT BETTER THAN THE TRADITIONAL PRACTICES?**

maximum people have voted for traditional practices Thus, we can say that sustainable construction practice in building design is better than the traditional practices.

**FACTOR’S INFLUENCE IN ORDER TO ADOPT SUSTAINABLE PRACTICES?**

maximum people have voted for water saving, green technique and health conscious. Thus, we can say that sustainable construction practice in building design is being adopted by people for health and green technique.

maximum people have voted for overhung fins and trees, courtyard and wind towers. Thus, we can say that sustainable construction practice in building design is being adopted by people for health and green.

# CHAPTER 5: CONCLUSION AND FINDINGS

**Conclusion**

In conclusion, using green materials is an important step in creating a more sustainable future. Not only do these materials offer numerous environmental benefits, but they can also improve indoor air quality and provide more durable and low-maintenance buildings.

By reducing our reliance on traditional materials, we can help conserve natural resources and reduce our carbon emissions. Additionally, using sustainable building materials can help reduce the amount of waste created during construction, as they often require less energy to produce and last longer than traditional materials, ensuring structural integrity. We urge our clients to consider the environmental benefits of using green materials and choose them whenever possible.

# FINDINGS

* From our data analysis we can see that more than 50 % people from our data base prefer using energy efficient, health cautions sustainable construction product and practices.
* Construction with sustainable materials in building practices from our data of 50; 40 people have voted for sustainable or green building approach. As compared to India 40% of people prefer and use sustainable construction practice.
* Also, data says that uses of sustainable construction practices in building design has proved more beneficial in longer times than the traditional one as it boosts up the human health from all perspectives i.e. economical, healthier, energy consumption and renewal approach.

### The major factor for switching towards sustainable construction practice in building design is extreme climate challenges and related health issues also the awareness throughout the country

* Through our research we found that people have voted for water saving, green technique and health conscious. Thus, we can say that sustainable construction practice in building design is being adopted by people for health and green technique.

### In our survey we found that sustainable construction practice in building design is still evolving and it still faces some problems in terms of availability and cost thus maximum people have voted for sometimes

# CHAPTER 6: SUGGESTIONS AND RECOMMENDATIONS

1. Conduct Awareness Campaigns: Organize awareness campaigns specifically targeted at the population of Kota through various tasks, conclave and conferences related to sustainable construction practices and techniques, to educate them about the benefits and features of. These campaigns can include seminars, workshops, and interactive sessions to address common misconceptions and concerns regarding sustainable construction practices in building design. Collaborate with N.G.O., community organizations, and educational institutions to reach a wider audience.
2. Local Language Communication: Consider providing sustainable construction practices IN building design awareness materials and communication in the local language of Kota (Hadoti region), to ensure better understanding and engagement among the people. This will help in breaking down language barriers and increasing the effectiveness of the awareness initiatives.
3. Address health Concerns: Since health is a major concern for individuals since post covid scenario and pre covid too considering sustainable construction practices in building design as in order to follow sustainability one has to follow some prescribed process and adopt some techniques like – recycle product, energy efficient design, environment friendly product and planning, emphasis is on orientation, ventilation, less carbon foot prints, building material life cycle. Educate people about the importance of using these process and technique, to protect their personal wellbeing as well as climate responsive construction techniques.
4. Demonstrate Convenience and everlasting: Highlight the convenience and long-lasting impact of sustainable construction practices in building design. Showcase how sustainable construction practices allows individuals to perform efficiently with the healthy environment
5. Offer Support and Training: Provide support and training programs to help individuals in kota become familiar with using sustainable construction practices and techniques. Offer hands-on training sessions or video tutorials that guide them through the process of setting up sustainable construction practices and techniques educational institutes many navigating the interface, and conducting common training programmers. Encourage practicing architects to have dedicated approach to assist users with any queries or difficulties they may encounter.
6. Collaborate with Local Businesses: Collaborate with local businesses, such as artisans and contractors to promote the acceptance of sustainable construction practices and techniques methods. Encourage them to offer exclusive supports for customers who opts for such practices. This collaboration will not only drive awareness but also create a favorable ecosystem for sustainable construction practices and techniques
7. Government Support and Infrastructure: Advocate for government support in improving infrastructure in Kota in terms of availability of green products and technology.

# CHAPTER 7: ANNEXURE

**Survey Questionnaire**

1. **Name:**
2. **Gender:**
   1. male
   2. female
   3. prefer not to say
3. **Age:**

1) 20-30 2) 31-40

1. 40-50 4) 50-60
2. **Budget**

1) Below 10 Lac 2) 10 lac to 15 lac

3) 15 lac to 20 lac 4) 50 lac and above

1. 25lac to 50 lacs
2. **Occupation**

1) Homeowner 2) Contractor

3) institute

1. **Qualification**

1) Non -educated 2) Graduate

3) Post Graduate 4) 12th pass

1. **In area of project?**

1) Aakash nagar 2) Coral Park

3) Kunhari 4) Jawaher Nagar

5) Pratap Nagar

8)**Do you use sustainable Construction Material?**

1) Yes 2) No

1. **Since how long have you been using sustainable Construction Material and building practices?**

1) For 1 years 2) For 2 Years

3) For 3 year 4) For 5 years

1. **Do you face any problem while using?**

1) Yes 2) No

3) Sometime

1. **Does the** **sustainable Construction Material and building practices construction field**

**Sector have made your life easier?**

1) Yes 2) No

1. **Are you satisfied with sustainable Construction Material and building practices?**

1) Yes 2) No

13)**Is sustainable Construction Material and building practices better than the**

**Traditional method?**

* 1. Yes b) No

14)**Which factor influence you in order to adopt sustainable practices**

a) energy efficient b) water saving

c)health-conscious d) Righteous material

e) green technique f) Cost saving

**15)Which sustainable construction technique you have used?**

a) shading devices b) ventilations

c)air locks /lobbies/balconies d) courtyard /wind towers

e) overhung fins & trees

# CHAPTER 8: REFERENCES AND BIBLIOGRAPHY

Managing Partner at A.W. Anchor Financial, LLC.

Rajesh Sharma Int. Journal of Engineering Research and Applications www.ijera.com ISSN: 2248-9622, Vol. 6, Issue 1, (Part - 4) January 2016, pp.134-144 www.ijera.com 136|P a g e

Sustainable Architecture Module: Qualities, Use, and Examples of Sustainable Building Materials

Page 10

Climatic Responsive Energy Efficient Passive Techniques in Buildings Dr Anupama Sharma, Associate Member K K Dhote, Non-member R Tiwari, Non-member

### 6.2 WEBSITES

**End of Project Report**