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"A REVIEW STUDY ON DESIGN, SIMULATION & ANALYSIS FOR PASSIVE BUILDINGS IN INDIA"

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ABSTRACT: -

This paper has an idea about architects with focusing and briefing on passive building design strategies to give idea concept about last design making decision making. while we look on India context its primitive example to start the usage of passive building design strategies including thermal comfort and also into the social context. it is most important factor to use passive building design strategies in built environment which can be beneficiary to minimize mechanical and electrical load. in highly rapid change in civilization, it is imposing a high pressure on dwindling energy sources, also aggravating energy process of degradation of environment. The most necessary requirement of any building is to perform regional for table climatic condition which can provide conductive & flexible environment to the end user.

Keywords – Passive building design, climatic condition, passive building, passive design

INTRODUCTION

context of India the traditional building or house has better thermal environment compare to modern structure due to some solar design feature like, courtyard, thickness of wall and tile floor roofs etc. in India there is the indoor environment condition & thermal comfort are the not perform desirable result due to improper design. only 10-20% energy can be Saved in mains, compare to modern structure to keep the indoor comfortless. With this kind of improper design in tradition house only can kept 3-degree Celsius cooler temperature achieved in summer. in contemporary house, the energy used to obey the thermal comfort is expected to rise up due to an intermittent and un-reliable function access to electricity supply in India. As an inverse effect of energy efficiency of late designs building id affected by segmental changes of modern building material. Solar passive design is the major tool to develop building more energy efficient and gaining thermal comfort through climate design principles. Operative energy in the building could be reduced in building by using the solar passive design and to develop energy efficient design. on implementation of energy efficiency strategies in new building, energy consume could be minimize by average 20%-50%.

NEED OF THE STUDY

Seeing the need for a law carbon footprint, a change to efficient housing that uses renewable energy bases can make a considerable contribution. An energy efficient and sustainable house design on a large scale can play an vital role in both developing and developed states. From a climate change and energy consumption viewpoint, countries that are using large amounts of fossil-free energy in electricity manufacturing and eventually in the housing sector need to reconsideration policies on housing. Passive house design, coupled with the Net Zero Energy Model (NZEM), can save a great amount of energy and reduce the carbon footprint. So, passive house and smart ways for energy managing and conservation are the main focus of this research and will be discussed in detail.

OBJECTIVES

To analyse different guild line & technology for the passive building designs in India.

CRITICAL LITERATURE REVIEW

Neha gupta and Gopal N tiwari in their study aim to indentify pasive heating and cooling system of building. Thry attempt to observe the passive solar heating and cooling concept with including thermal management .they use the different concept of thrombi wall , solarium, evaporative cooling ,radiative cooling, BiPVT(building integrated photovoltaic thermal) system. They also differentiate the result by comparison of various heating and cooling concept which has been made. they have been visualizing that heating via double glazed window has more potential to save maximum conventional fuel for thermal hearting during winter and the concept of evaporate cooling is the more economical too in summer period.

The authors find that the passive heating is the direct gains are more reliable for the pick -day hour for offices, and the remaining concept are for residential building and the solarium system can be useful for the both. Usage of double-glazed system impacted 9%ofn heating & minimize the losses by 28%comparing with single glazed system. which resulting u-value reduction. They also find the heating cooling combination of walls & tile roof cover resulting 46% & 80% of saving in both winter and summer.

One of their strengths of their research is that they find that the BiPVT systems gives a good desirable reading. in terms of efficiency, thermal environment, heating, lighting and use of electricity. they found the photovoltaic system are the most accurate replaced energy sources in reduction of pollution, reduction of electricity.

However, their research is conducted on past and present data. They did not mention any future scope or any future technologies that can be conducted.

C.V Subramaniam, N. Ramachandran and S. senthamilkumar in their study aim to identify design and analysis of solar passive architecture for thermal comfort of residential buildings in warmth humid climate of thanjavur region , India . they observe the solar passive design concept and principle which are the used in traditional building worldwide. They studied the thermal performance of traditional building which resulting within the prescribe thermal comfort standard their study and analysis of thermal performance carried out in summer in already design building with compare to another contemporary building. hence, they try to achieve the design and working for a construction of contemporary residential building withing solar passive design.

The authors find that design solar passive house can be improved via using the combination of traditional building with the solar passive techniques. which could bring the indoor temperature down enough to comfort the indoor environment and occupant.

They found solar passive building design resulting 2-3 degree Celsius much cooler in summer while comparing other traditional house.

One of their strengths is that passive building design play vital role to save energy, which resulting the impact of national and global economy.

How ever the limitation of their study is that “ten- solar passive designs” are the incorporated in predesign building which included different element like orientation & planning light colour painting, roof whiting, shading element etc.

Arsh bansal in their study aim to identify the studies in to the usage of passive design strategies to inform early design decision making in an individual context with hot arid climate for residential buildings. He observes the requirement passive strategies. design in indoor built environment can be remarkable as an important factor to minimize the mechanical loads & electricity saving. his study compares the two design groups of design which mainly focus on (a) solely passive design strategies and (b) design in low-cost condition. As per his study the term” passive design “reflect a series of used strategies design by the developer of building among climatic necessity

The author finds out that the different themes particular element of passive design. He approaches to solving ventilation issues by using wind direction, and wind speed. also, they found out the approaches to spatial planning and internal temperature.

One of his strengths is that they identify and analyse the different themes to cost saving and energy efficiency. also, he provided guide lines how to provide the law temperature, with respect to direction, shading, energy loads etc.

How ever the limitation of his study is that fixing the themes or approaches given must be conducted under the designer which will be time consuming process as well as the long process which can be resulting the

more complexity.

Y. anand , A.gupta and Avi gupta in their study aim to comparative thermal analysis of different cool roof material for minimizing building energy consumption . they observe that due to frequently change in living standard the energy usage of in building is continuously increased. They identify that sub spatial amount of global energy is 40% by which the room temperature maintains around 20-22 degree centigrade. they observe that in low temperature area the energy de demand for indoor heating and cooling is less compare ti high temperature area where the demanded energy extracted from burning the fuel.
The authors also finding that implementing a good threshold energy can improving a quality of energy supply and demand. they also get idea about estimation of energy efficiency for all new building energy consumption reduce by on an average of 20-30 degree centigrade.
One of their strengths is they propose the method for minimize the heat gain on top roof which has cool roof pavement application. They show calculation of roof gain heating energy to the roof gain heating after cool roof coating which resulting the cooling ratio around <10-degree centigrade: (+-) 3 degree centigrade.
One of their limitations is that they derive study of cool roof energy conservation only on roof top only. Also, they show only outer surface cooling theory but they did not show how directly the indoor cooling and heating can be done.

MAJOR FINDING

Passive building design mainly deal with thermal cooling and heating. Also, the indoor and outdoor temperature maintaining themes are there for the passive design.

With frequently increase of living standard the demand of the energy foe cooling as well as heating and energy conservation is high.

By using different systems, the u-value reduce are

1. Double glazed system -9% (impacted), resulting 28% (minimized energy loss)
2. Thromb wall & cool roof cover saved energy around 46-80%
3. Bispvt system is best for the low as well as high temperature area which resulting 20-50 % energy conservation

U-values and linear thermal bridging details are passive design measures for the energy efficient building. They determine the energy demand required to keep the inside warm. The better it is, the smaller and cheaper the boiler or heat pump.

Solar passive building design which has the design strategies which can reduce indoor temperature by 2-3 degree centigrade much cooler than traditional houses.

There are few themes to analyses are cost minimize theme and energy saving themes which are follow as,

1. Low temperature themes
2. Wind speed themes
3. Wind direction themes

The cool roof top system estimated the energy efficiency for an all-new building construction, the energy losses reduce by 20-30%.

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