Energy Conservation

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***Abstract* - Green building known as green construction or sustainable building, is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from sitting to design, construction, operation, maintenance, renovation, and deconstruction. this practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. although new technologies are constantly being developed to complement current practices in creating greener structures, the common objective is that green buildings are designed to reduce the overal impact of the built environment on human health and the natural environment by: • efficiently using energy, water, and other resources • protecting occupant health and improving employee.**

INTRODUCTION

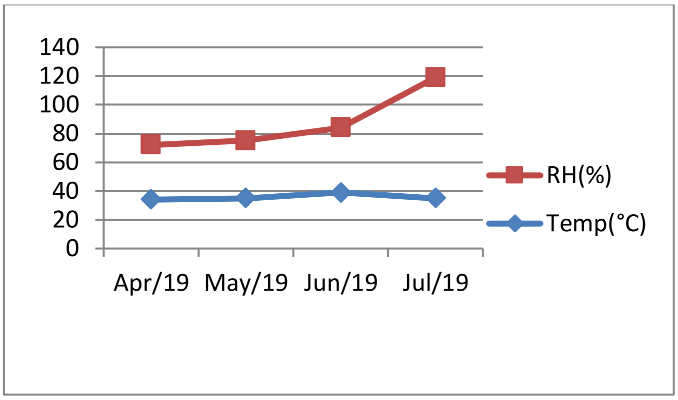
Green building brings together a vast array of practises and techniques to reduce and ultimately eliminate the impacts of buildings on the environment and human health. It often emphasises taking advantage of renewable resources, e.g., using sunlight thru passive solar, active solar, and photovoltaic techniques and using plants and trees thru green roofs, rain gardens, and for reduction of rainwater run-off. Many other techniques, such as using packed gravel or permeable concrete instead of conventional concrete or asphalt to enhance replenishment of ground water, are used as well. While the practises, or technologies, employed in green building are constantly evolving and may differ from region to region, there are fundamental principles that persist from which the method is derived: Siting and Structure Design Efficiency, Energy Efficiency, Water Efficiency, Materials Efficiency, Indoor Environmental Quality Enhancement, Operations and Maintenance Optimisation, and Waste and Toxics Reduction. The essence of green building is an optimisation of one or more of these principles. Also, with the proper synergistic design, individual green building technologies may work together to produce a greater cumulative effect. On the aesthetic side of green architecture or sustainable design is the philosophy of designing a building that is in harmony with the natural features and resources surrounding the site. There are several key steps in designing sustainable buildings: specify 'green' building materials from local sources, reduce loads, optimise systems, and generate on-site renewable energy.

Demand for energy is increasing day by day and is likely to increase in tune with industrialisation / urbanisation. Building consumes more than 30% of total energy consumption and hence the demand is to conserve energy in several ways by all means. Amongst the various application of energy of the buildings and utilisation of day lighting, is perhaps the most direct and simple option as well as most desirable one in view of high-energy consumption for these applications. In this thesis it has been tried to quantify the energy saving in the Building of IIMT College, Greater Noida. Temperature and Relative Humidity were measured daily of two hours intervals (7.00am to 6.00 pm) for four months (April-2019 to July-2019) of referents locations of the college buildings. This study is of limited in nature, and to have definite conclusion, it should be extended to several buildings, it is recommended to green building concepts. Thermal Comfort: Several environmental parameters were measured within the building to characterise thermal comfort. Thee measured parameters were temperature, relative humidity, and percent predicted dissatisfied (PPD). The result of the thermal comfort measurements are presented in Table 5 as the average measured values for a morning and an afternoon set of measurements performed on each of the two days of sampling. Each value shown in the table is the average of between two and six measurements taken throughout the entire zone. Temperature was fairly uniform throughout all zones, as indicated by the fact that standard deviations (not shown in the table) of each set of measurements were always within 5% of the average, and all measurements were between 21ºC (70°F) and 25°C (77°F). The relative humidity was between 20% and 35%. All of the PPD measurements were below 10%, which is indicative of acceptable conditions for thermal comfort based on the assumptions of clothing and activity levels used in performing the measurements

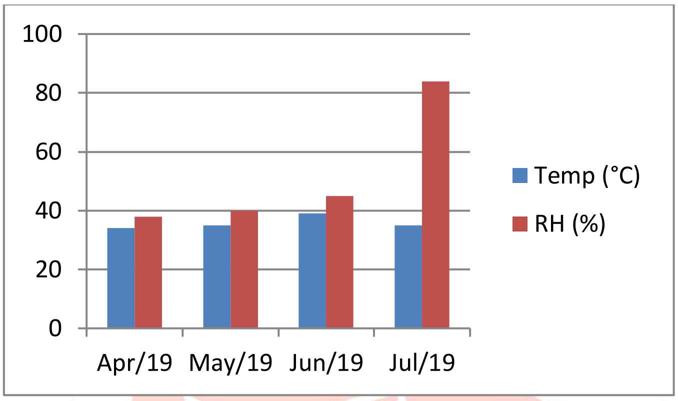
STATION: IIMT College Greater Noida
Monthly Average Temperature (°C) and Relative Humidity (%) from April-2019 to July-2019

Month	Monthly Average Temp °C	Monthly Average RH (%)
April-2019	34	38
May-2019	35	40
June-2019	39	45
July-2019	35	84

Monthly Average Temperature °C and Relative Humidity (%) Graph from April-2019 to July-2019.



Monthly Average Temperature (°C) and Relative Humidity (%) Bar Chart from April-2019 to July-2019.



4: CONCLUSSION

The term "green building" is used to describe buildings that are designed, constructed, and operated, to have a minimum impact on the environment, both indoor and outdoor. Most discussions of green buildings refer to the importance of providing an acceptable, if not exceptional indoor environment for the building occupants. However, these discussions of indoor environmental quality have not included many specific recommendations or criteria for building design, construction, or operation. Building projects described as green building demonstrations often make reference to indoor air quality, but these references are often general and qualitative. In addition, rating systems that have been developed to assess the "greenness" of a building are based largely on design features and are not particularly specific with respect to indoor air quality. This paper reviews the features of indoor air quality that are considered in green building discussions, demonstration projects, and rating systems. These green building features are discussed in terms of their completeness and specificity, and are compared to other guidance on building design, construction, and operation for good indoor air quality. A case study of indoor air quality performance in a green building is presented. This study includes a description of the indoor air quality features of the building and the results of a short-term indoor air quality evaluation of the building involving ventilation and contaminant concentration measurements. The manner in which indoor air quality is addressed in discussions of green buildings and green building relating systems was reviewed and discussed. In reviewing green building demonstration projects, it was seen that many issues related to indoor air quality were not discussed. The issues that were discussed, to varying degrees of specificity, were building ventilation and material selection for low VOC emissions. Also, indoor air quality issues were not always fully addressed with respect to their "greenness", e.g., the trade-off between increased ventilation and energy use. This is most likely due to the inherent difficulty in making these trade-off decisions between difficult-to-quantify parameters. Issues related to indoor air quality frequently were not mentioned at all, and only the energy-related issues were addressed. Based on the reviewed rating systems and demonstration projects, it appears that demonstration projects need to be more comprehensive and specific in addressing indoor air quality issues. Indoor air quality guidance in general, including green building rating systems, is challenged by the current limits of knowledge and the inability to be quantitative on all issues, e.g., VOC concentration limits and emission guidelines. Specifically, there are no standard methods for determining emission characteristics of materials, and there are inadequate data concerning the health effects of the compounds emitted. This problem not only exists in the emission test laboratories but is further confounded by the unlimited possibilities of material combinations, loadings, and building operating conditions that can occur within the built environment. Indoor air quality is an important feature in almost all discussions of green buildings and is featured prominently in current green building rating systems. However, these rating systems are focussed primarily on building design as opposed to actual performance. As has been seen in many studies of building performance, design goals are not always realised in practise due to short comings in building construction, operation, and maintenance. Since there is no reason to expect that green buildings will not have similar problems, performance testing is key to determining whether indoor air quality design goals have been realized in green buildings. This was revealed with respect to several indoor air quality issues addressed in the case study of the green building demonstration projects presented in this paper. TVOC measurements revealed an episode of elevated source strength significantly greater than those measured earlier the same day and the next day, indicating that even though much attention was given to the selection of building materials, unanticipated sources can still be introduced into the building. Elevated carbon dioxide levels appeared to be related to the outdoor air ventilation rates. Even though the building ventilation system was designed with ventilation rates well in excess of those recommended in ASHRAE Standard 62, the actual rates at the time of the measurements were below the design values on most of the floors. The reason for the discrepancy between the design and actual ventilation rates was not analysed, but it is more likely to be an operational issue than a design issue. While differences between design and operation are not unusual in buildings, their existence points to the need for performance monitoring in green and other buildings

5: RECOMMENDATION

The following recommendation have been made for Energy Conservation in Building and its Environmental Benefits (Green Buildings):

(1) The wind direction and velocity must be studies as per seasonal variation and building must be oriented.
(2) The Sun rise and Sun set and its impact on building radiations must be taken into consideration and accordingly. The material of the building must be selected specially for exterior and interior design of the building.
(3) The impact of rain water on the building and its surrounding must be considered for the thermal comfort of the building along with reduction in Air- Conditioning through ventilation.
(4) The vegetation cover should be design as per the eco-inventory of the building plan and accordingly the vegetation cover that is selection of trees, selection of shrubs and ground cover must be taken into consideration.
(5) The rain water harvesting for the ground water improvement with respect to quality and quantity must be considered with concept of zero rain water discharge out of the building.

Finally the relation-ship of the building with soil, water and vegetation must be considered in order to improve the environment of the building and its surrounding.

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6: RESULTS AND CONCLUSION

- The compressive of the dismantled pre –stressed concrete aggregate is higher than the fresh concrete aggregate.
- The recycled aggregate concrete absorbs more water than the fresh aggregate concrete.
- The average modulus of elasticity is higher than that of its Standard value.
- All the concretes presented workability satisfactory, and the concrete with recycled aggregate behaves like the conventional concretes, when RCA is used in the condition previous wetting.
- One of the factors that justify this is the fact that RCA is a porous aggregate, summed to the emptiness let by the drying of the concrete that are compressible.

7: Bibliography

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