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A CASE STUDY

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Application of solar energy for thermal comfort in the house

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ABSTRACT

Solar energy is one of the forms of energy which can be effectively used to create thermally comfortable indoor situations. Solar energy is available in abundant quantity. It can be used for heating and cooling of building. According to use of any mechanical device or fan, the systems can be classified as passive system or active system. This paper covers different methods to be adopted for various situations and their comparative analysis for proper selection for prevailing environmental outdoor conditions.

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Key words : Solar architecture, Active and Passive architecture

INTRODUCTION

Sun is major source of energy on the Earth. Solar energy, wind energy, bioenergy, hydro energy, wave and tidal energy are derived from sun. All biological activities including human life is possible with sun only. Solar energy received on the earth in the form of solar radiations. Wind energy is generated by uneven heating of earth surface. For hydro energy the water cycle derived by heat received from sun. Wave and tidal energies are created through solar and lunar pressure. Solar thermal power available on average outside earth's atmosphere is estimated about 1353 W/m2. This estimate total quantity of solar power received on earth surface about 17.7 x 10^{16} W which is 10^{5} times of world's electric power capacity. Solar energy received on roof is 10 times the heat demand of the house.

Solar architecture:

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"Solar architecture implies buildings whose design integrates the thermal, directional and seasonal aspects of sun". Solar energy can be used for heating and cooling of buildings. From ancient ages solar energy is being used for this purpose.

MATERIALS AND METHODS

In this paper details of the different components of the thermally comfortable building were studied. Their importance and precautions are also discussed at relevant places.

Basic elements of solar building:

- Space – to be heated or cooled
- Solar collector for heating system or sink for cooling system
- Thermal storage

Principles of solar architect:

- Face south where sun spends winter
- Keep the winter winds away - embankments or vegetation
- Shade against the summer sun
- Cooling be done by evaporating water
- Work with nature

Solar architectural systems: