ABSTRACT

The major Energy consuming sector is the Building sector. Sustainable and Climate Responsive Architecture offers possible solutions to these challenges. In general according to the principles evolved over many generations, it is an assumption that the traditional houses which were constructed with traditional materials applying the traditional construction techniques and traditional design strategies are more responsive to the climate than the newly built contemporary houses. This statement is unexplored with scientific methods. This research paves way to understand such beliefs to put forth a valid answer to these assumptions.

The measurements of the various attributes of temperatures of the traditional houses and contemporary houses during hot seasonal months, located in a particular climatic zone support the validity of this research. As modern methods prevail, the techniques and principles of Traditional architecture are vanishing these days. This is unfortunate since, most of the old buildings employ natural materials and simple concepts which are energy efficient.

Most of the buildings which are constructed today have not taken into account, the green concepts used in traditional buildings. Therefore, there is a need in studying the green concepts used in Traditional buildings and adopt the same in our present and future design.
This research aims to explore and assess the climate responsive passive solar design techniques, that promote high thermal comfort in traditional Chettinadu houses located in the warm humid zone of the state of Tamil Nadu in India. The study of these houses provides useful insights for designing energy efficient houses that provide thermally comfortable conditions. An experimental analysis of these houses at Chettinadu regions in Tamil Nadu, India provides a context for the field research. The above research is achieved by the following objectives.

- To study how “Climate Responsive Principles” is effectively conducted in Traditional Architecture.

- To conduct the Qualitative study (indeterminate) and quantitative study (measurable) through experimental investigation by selecting two sample houses from Traditional and modern houses.

- To investigate the occupants Thermal comfort levels through interviews and questionnaire with the occupants in both Traditional and Modern houses.

- To compare the results of the experimental investigation to the existing thermal comfort standards of ASHRAE and olgyay bio climatic chart and chart out the conclusion.

In order to find out a real term solution of the thermal performance of traditional houses located in warm humid climatic zone, two houses of traditional type and two houses of modern type were selected and studied.
during the predominant summer seasons of March, April, May and June months of 2009 and 2010. The Thermal comfort study was carried out by continuously monitoring the indoor and outdoor thermal conditions, with the help of a custom made instruments setup with various sensors to measure the temperature, relative humidity etc, called as AES (Architectural Evaluation System). With the help of this setup, the study was conducted in selected traditional and contemporary houses so as to find out the internal temperature parameters among these two house typologies (contemporary and modern) and to compare that with the prevailing outside temperature.

After comparison of the results, the findings indicated that the traditional houses showcases natural and passive climate control system and provides comfortable indoor environment irrespective of the outdoor climatic conditions. Further to ensure, the thermal comfort level is compared with the ASHRAE standards and the bioclimatic chart constructed by Olgyay.

To reinforce the study, an occupant survey of comfort and preferences was also conducted among the occupants of the houses of the same locality. The findings of the survey also showed a preference for traditional houses over contemporary houses.

With all these results, it is proved that the Chettinadu Traditional Houses are thermally comfortable and they are more Climate Responsive than the contemporary houses of the given climate zone.