



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 Issue: II Month of publication: February

DOI: <http://doi.org/10.22214/ijraset.2019.2114>

www.ijraset.com

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Planning Considerations for Optimizing Comfort Conditions

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Synopsis: *Throughout the entire history of building & Architecture in the present day even in the primitive architecture we find quite sophisticated examples & expression of Climatic Design may it be for wind protection solution for these indigenous examples are governed by the architectural style where the climate served as the basis of Human Livability.*

I. INTRODUCTION

Climatic design is the one approach by which the energy cost of a building could be reduced comprehensively. In all the climates, the buildings built according to climatic design principles reduce the need for mechanical thermal heating / cooling energy by using Natural Energy available from the climate at the building site, resulting in long term energy saving. Design buildings in consonance with natural energy flows have other benefits also. The climatically designed buildings are more comfortable & the building can do the work quietly without fans or mechanical heating / cooling, thus reducing the peak hour demand on power system. In this way the building responds to the Natural Environment, whether through a window, a sky light, green house, covered porch or a protected porch or a protected courtyard, which establish a balance between Indoors & Outdoors Comfort conditions. The physical comfort we feel in the building is the result of the heating or cooling energy balance between the human being & the surrounding space. This, energy is exchanged between ourselves & the physical surface & the material of our building, & can be mentioned in four principles of Heat flow:-

- A. Conduction
- B. Convection
- C. Radiation &
- D. Evaporation.

II. COMFORT CONDITIONS

The sun, wind, precipitation & the resulting temperature create sources of Natural Heating or Cooling.

In winter or under heating season the heating energy is desired so the objective of climatic design is to resist loss of heat from the building interior & to promote solar heat gain through South & West facing opening.

In summer these objectives are reversed i.e. to resist solar heat gain through sun shading & to promote heat loss from interior.

To achieve the above conditions the strategy to be followed in summers & winters should be to promote or resist heat flow within the building envelope.

A. Control Strategy

- 1) Winter
 - a) Promote Gain
 - b) Resist Loss

- 2) Summer
 - a) Resist Gain
 - b) Promote Loss

Different techniques are used in design or construction, which uses natural energy, flows to create human comfort conditions in the building. These three could be adopted at the time of:-

- i) Site Planning.
- ii) Building Massing & Planning.
- iii) At Detailed Design of the Building Envelop & Openings.

III. PLANNING PARAMETERS

The design practices could be grouped according to the sequence of design decision process related to the climatic design principles that it follows. Each of the techniques is a way to fulfilling one of the following parameters / concepts of climatic design.

- A. Plants & Water Summer
- B. Earth Sheltering Winter & Summer
- C. Wind Breakers Winter
- D. Indoor / Outdoor room Winter & Summer
- E. Solar Walls & Windows Winter
- F. Thermal Envelop Winter
- G. Natural Ventilation Summer
- H. Sun Shading Summer

I.

1) *Concept - A: Plants & Water (summer)*

These used to provide cooling by shading & evaporation.

- A.1 Use ground cover & planting for site cooling (Site Planning).
- A.2 Maximize on site evaporative cooling (Site Planning).
- A.3 Use plantation next to building skin (Building Envelope).
- A.4 use of roof spray for evaporative cooling (Building Envelope).

2) *Concept - B: Earth Sheltering (winter /summer)*

Using earth against the wall or on roof of the building have a number of advantages i.e. for winter insulation.

- a) For Wind Protection &
- b) For Summer Cooling

B.1 Recess structure below grade or raise existing grade for earth shuttering effect (Building Massing).

3) *Concept - C: Wind Breakers (winter)*

These serves to minimize winter wind, Exposure.

- a) 1 Use neighboring land forms, structure or vegetation for winter protection (Site Planning).
 - b) C. 2 Shape & orient the building to minimize wind turbulence (Building massing).
- 4) *Concept - D: Indoor / outdoor Room (winter & summer)*

Court yards, covered patios, seasonal & glassed – in porches can be located in the building for summer cooling & winter heating benefits by the following techniques:-

- a) D.1 Provide outdoor semi-protected areas for year round climatic moderation (Building Massing).
- b) D.2 Plan specific functional areas to coincide with sun path (Building Plan).

5) *Concept – E: Solar Walls & Windows (winter)*

By using winter sun through windows & walls oriented according to sun path.

- a) E.1 Maximize reflectivity of ground & building surface outside windows facing sun (Site Planning).
- b) E. 2 Shape & orient the building to maximize exposure to sun (Building Massing).
- c) E.3 Maximize exposure to summer breezes & provide reflective panels outside glazing to increase winter radiation (building Openings).

6) *Concept – F: Thermal Envelope (winter)*

The interior spaces are isolated from the cold winter climates to save heating energy.

- a) 1 Minimize outside wall & roof areas (Building Massing).
- b) F. 2 Centralize heat source with – in building interior (Building Plan).
- c) F. 3 Use vestibule at entry ways (Building Plan).
- d) F. 4 Locate low use spaces (Stores, Garage Etc.).
- e) F.5 Select high capacitance material for controlled heat flow through building envelope (Building Envelope).

7) *Concept – G: Natural Ventilation (summer)*

This is necessary to cool a house & can be done by using the following techniques:-

- a) G.1 Use neighboring landforms, structures or vegetation to increase exposure to summer breezes (Site Planning).
- b) G. 2 Shape & orient the building shall to increase exposure to summer breezes (Building Massing).



- c) G. 3 Use opens to promote interior air flow (Building Plan).
- d) G.4 Use double wall / roof construction for ventilation within the building shell (Building Envelope).
- e) G. 5 Orient door / Window openings to facilitate natural ventilation from prevailing summer breezes (Building Opening).
- f) G. 6 Use wing walls & over hangs to direct summer wind flow into interior (Building Opening).

IV. RECOMMENDATION

The total process of planning considerations are based on the climatic its process to achieve the optimizing comfort zones. It is very much required to achieve the good planning considerations. It is bi-lateral benefited to the nation invest less finance & get proper & effective results. The landscape of particular region is again important & essential to obtain all types of species to use on particular way to achieve optimizing level of planning considerations.



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