

Vernacular Architecture- Mirror of Climatic Response and Culture in Rajasthan

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Abstract:- The architecture of region is expression and of development of culture, social and economic values of a community and impact of geographical and climatic conditions. Vernacular construction materials and techniques play a vital role in shaping architecture of the region. This is used in abundance by uneducated local people without formal education of architecture. The knowledge of vernacular materials and technique are passed on one generation to other with working in groups and oral communication. Positive and negative aspects of these techniques are open architectural literacy can eliminate it. This practice will counter answer to the current globe climatic problems.

Keywords:- Vernacular architecture, Culture, Rajasthan.

I. INTRODUCTION

Vernacular architecture is specific for a particular region. It is the architecture of the region by the people of the region, without formal educational guidance. It is the story line of the society and its culture. It a response to the climate, appreciates the local material and makes the best use of it in all possible ways. Vernacular architecture evolves the environment culture and historical context in which it exists. It has been always raw, unrefined.

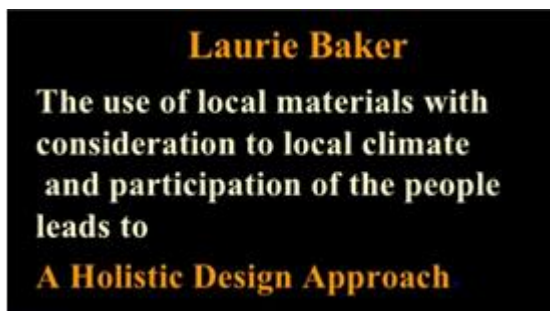


Figure 1 Quote by Laurie Baker

➤ Culture

Culture is the knowledge and behaviour pattern sharing of a social group. Culture encompasses religion, language, cuisine, dance, music and art. The behavioural pattern is responsible for space requirement.

➤ Aim of the Study

The research will be carried to analyse the vernacular materials and design concepts in reference to contemporary context for residential units only.

➤ Object of the Study

- To study and understand the vernacular materials.
- To study and understand the vernacular techniques.
- To study and understand the design concepts used in hot and dry climate of Rajasthan.
- To study and which type of innovative materials can be used with Vernacular design concept.

➤ Scope of Study

The vernacular architectural concepts and techniques for various spaces like market, theatres city development can be studied and redefined for contemporary era for effective implementation.

II. METHODOLOGY

- The study of different residential units.
- Identify various materials and their techniques.
- Identifying design concept and their response to climate.
- To study and search which type of innovative materials can be used for Rajasthan.

III. LIMITATIONS

The study will be restricted to residential units only in Rajasthan.

➤ Factors Influencing Vernacular Architecture

- Climate
- Culture
- Material

➤ Climate of Rajasthan

Rajasthan has varied climatic zones from extremely arid to humid climatic zones. East and Southeast zones are humid zones, excluding the hill. The heat is dominant in summers, June is the hottest- month. Temp varies from 30 °C- 45 °C. In Western zone Rajasthan of it rises up to 48 °C hot winds and dusty storms occurs. January is the coolest month of winter season. Daily temp in winters 40sF to the mid-70s F. Rain fall is 500mm in some areas.



Figure 2 Geographical Map

- Culture of Rajasthan Influencing Architecture
 - Use of more than one courtyard (different spaces for male and female)
 - Sit-outs used at the entrance of the house.
- Vernacular techniques required for heat control
 - Vernacular Construction Techniques of Rajasthan
 - More Than One Court Yard
 - Stimulating Heat loss
 - Small Windows



Figure 3 Textured wall and Jharokha with Jalli detail on Patwon Ki Haveli, Jaipur



Figure 4 Shading device and small window detail from a kacha house in Rajasthan



Figure 5 Plan of Nathmalji Ki Haveli

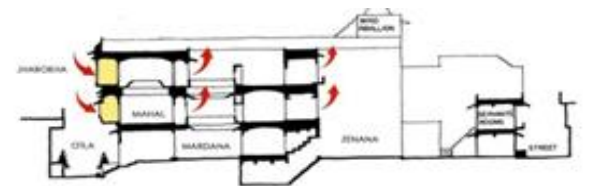
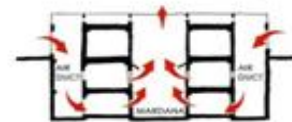


FIG: Transverse Section of the Nathmalji Haveli.



Vertical Section of Nathmalji Haveli through the Mardana.

Figure 6 Sections of Nathmalji Ki Haveli

- Vernacular Design Concept For Hot And Dry Climatic Regions of Rajasthan:
 - Climatic courtyard planning
 - Shading elements
 - Textured walls
 - Thick slabs and walls

ROOF SECTION

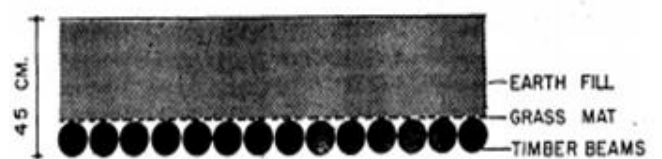


Figure 7 Roof construction technique of Nathmalji Haveli

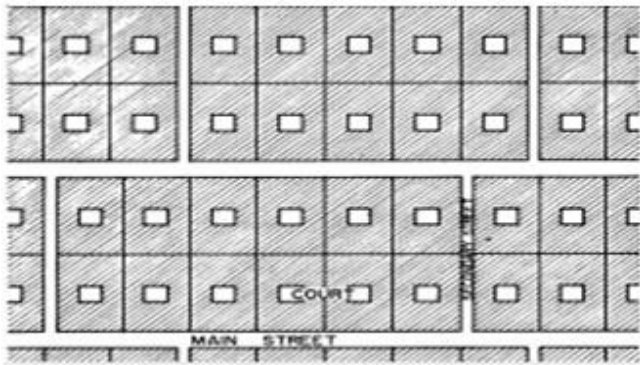


Figure 8 Planning including central courtyard in each residence

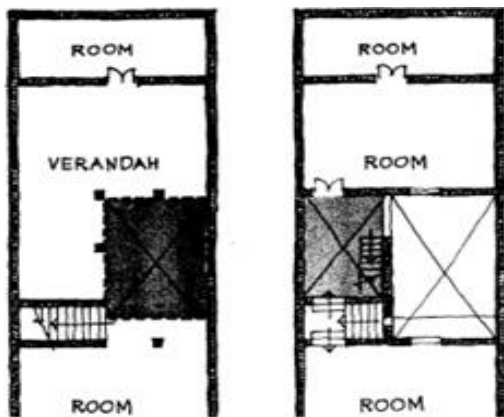


Figure 9 Courtyard planning row houses

Vernacular materials of any region are suitable to climatic response of that region. Hence innovative contemporary materials with same elements combined with some other materials enhancing the thermal response with vernacular design techniques will be more effective to achieve heat control of the structure.

IV. CONTEMPORARY MATERIALS & TECHNIQUES FOR THERMAL CONTROL



Figure10 Hollow clay blocks

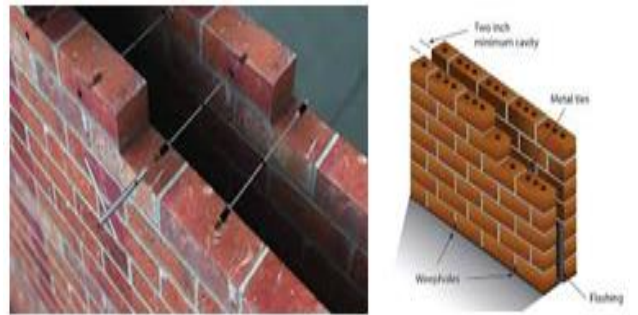


Figure 11Cavity wall



Figure 12Perforated brick wall



Figure 13 Filler slab



Figure 14 Brick wall



COMPRESSED STRAW
BLOCKS

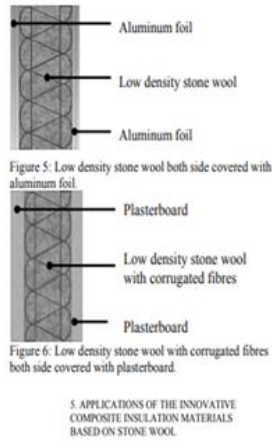


Figure 15 Construction detail of compressed straw block

- Considerations and application of basic principles of vernacular architecture with innovative techniques will pave echo friendly path for future.
- Address to social needs of the users – provision of outdoor areas (verandas and balconies) provision of male-female courtyards and spaces.
- People will comfortably accept such materials and techniques.

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