VERNACULAR ARCHITECTURE
IN HILL REGION

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HILL ARCHITECTURE
(HIMACHAL, J&K, LADHAKH
J&K, N.E. States, Bhhutan, Sikkim, Gujarath, Nilgiris )
The term vernacular is derived from the Latin vernacula, meaning "domestic, native, indigenous"; from verna, meaning "native slave" or "home-born slave". Hence it means ‘native science of building’.
The term “Vernacular Architecture" in general refers to the informal building of structures through traditional building methods by local builders without using the services of a professional architect. It is the most widespread form of building.
Vernacular architecture stems from the belief that architecture is a balanced combination of:

- logical knowledge,
- divine inspiration and
- common sense.
Vernacular architecture, as the term, refers to the construction methodology that natives employ to build shelters using locally prevalent resources and conditions.
SYNONYMOUS TERMS

• ancestral or traditional architecture
• primitive or aboriginal architecture
• indigenous architecture
• folk, popular, or rural architecture
• ethnic architecture or ethno-architecture
• informal architecture
• the so-called "anonymous architecture" or "architecture without architects;"
• "non-pedigree" architecture
• eco-friendly architecture
“It is the architecture of the people, by the people, but not for the people.”

PAUL OLIVER defines in his book “Dwellings”
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INFLUENCES ON VERNACULAR ARCHITECTURE

• CLIMATE - Most significant influences on vernacular architecture is the macro climate of the area in which the building is constructed.
  - Temperature
  - Precipitation
  - Wind speed

• CULTURE
• ENVIRONMENT AND MATERIALS
CHARACTERISTICS OF VERNACULAR ARCHITECTURE

- Dwellings and structures that are built as a product of traditional customs and practices,
- Often built by the users themselves,
- Representing a far less degree of specialization
- The structures made by empirical builders without the intervention of professional architects.
- They have emerged out of hard necessities, hard work and hard lives.
- Construction methodology that natives employ to build shelters using locally prevalent resources and conditions.
TYPES OF VERNACULAR ARCHITECTURE

• Rural
• Urban
• Commercial
• Hill
• Indian vernacular architecture
• Kachcha
• Pukka
• Semi-pukka
HILL ARCHITECTURE SITES IN INDIA
Jammu and Kashmir - Amarnath, Leh, Ladakh, Shrinagar, Gulmarg, Pahelgam, Rajouri, Patnitop , Dah And Hanu, Aru, Kishtwar, Sonmarg, Kishtwar

Himachal Pradesh - Kullu Valley, Manali, Rohtang Pass, Chamba, Kangra, Khajjiar, Kinnaur, Mandi, Chail, Dalhousie, Dharamsala, Kasauli, Shimla. UNA, LAHAUL VALLEY, HAMIRPUR, BILASPUR, Solan, KINNAUR, SIRMAUR.


Sikkim - Gangtok, RAVANGLA At the base of Maenam Hill, Pelling, Rinchenpong, Tendong Hill, Nagaland - Kohima
Manipur - Imphal
Rajasthan- Mount Abu
Gujarat – Saputara
Maharashtra – Mahabaleshwar, Panchgani, Khandala
Andhra Praadesh - Horsey Hills
Tamil Nadu - Ooty, Kodaikanal
Kerala - Ponmudi, Peermadam Munnar, Dailkumam, Wayanad
HIMACHAL PRADESH

Him (Snow)
Anchal (the extreme part of the sari)
SETTLEMENT:
• Along River side and agriculture land
• In cluster of 20–25
• Along the contours
• South facing
CONSTRUCTION IS COMPLICATED DUE TO:

- Difficulty of getting suitable orientation on the hill slopes.
- Problems of soil erosion and land slides.
- Restrictions by the forest department. (ban on cutting of the trees).
- Existence of tall shady trees and dense forest area, which obstruct the winter sun required for the buildings.
- Limitations on the height of the building due to earthquake risk.
- High cost involved in the site development due to the cutting and the filling process.
- Non-availability and transportation problems of construction.
STYLE VARIATION

• The regions, comprising the Kullu valley, Satluj valley and the Ravi valley, a great commonality of styles exists.

• In the Satluj valley region, the typical house consists of stone and timber walls, constructed in what is known as Kath-Kona style, an indigenous style of construction, in which the walls are made with alternate courses of dry stone masonry and timber without any cementing mortar.
• Ravi valley, the walls of the traditional houses are built mostly with the dried masonry, without using any alternate layers of timber. These walls are plastered with mud both from inside and the outside.

• In some parts of Himachal Pradesh, there is a popular use of the Dhajji wall construction. In this construction system, the walls are made of timber frames with in-fills of light thin panels made by close packaging of mud mortar, stone and ballast. The traditional Dhajji wall (framed wall)
PLANNING

• Consists of two rooms.
• One on top of another and is built with mud, stone and timber.
• Usually the ground floor is used for keeping cattle and storing grain and fodder.
• The upper floor is the main living area
STRUCTURE

- Load Bearing
- Bhattar Wall (Bhattar Means Filling of Stone or Brick)
- Kath Kundi or Kona (Kath means wood and Kona means corner)
- Taq Construction
- Without cement mortar

A typical Taq Wooden Frame
• Stone Foundation

• In past Reinforcement of timber Beam and It was dry.

• Now Reinforcement of R.C.C. Beam it is With cement mortar
WALLS

- Beams (bhatar) in the walls act as ‘seismic bands’. (Himachal comes under Earthquake Zone – 4 & 5)

- All walls are connected to each other through stone masonry and timber beams.
ROOF SLOPING - WOODEN

- Protects Dead load by falling down snow.
- Projects less load to the base structure of bhattar
- Roof frame binds all walls together
OPENINGS

• Small (Max 3’0” wide)

• Height (Max 6’0”)

• A bigger window, the beams go through the window.
FLOORING AND FLOOR

- Wooden Structure for I floor.
MATERIALS AND IT'S SIGNIFICANCE

• Mud - easy availability, good insulation and the good binding properties.

• Wood - the forests of the deodar wood and other mixed forests were easily available. Wood is used to impart stability to tall structures.

• Stone – remains in use but its usage is restricted to the plinth to give strength.
Himachal has a rich heritage of handicrafts. These include woolen and pashmina shawls, carpets, silver and metal ware.
KASHMIR VALLEY
SETTLEMENT

- Permanent Dhajji House
- Semi permanent Donga (House Boat)
- Temporary Kacchi Huts
Permanent Structure
Dhajji House
Dhajji Walls: Load Bearing Structure

- Lintel board or Header
- Jambs
- Sill board
- Timber boards
- Joists
- Wall plate
- Posts (main frame)
- Studs (thinner than posts)
- Horizontal boards
- Bracing boards
- Base plate (in Urdu: Dasa)
- Plinth (stone masonry)
‘Dhajj’ means ‘patchwork quilt’
A Dhajji house is a patchwork of timber and stone.
Why is a Dhajji wall strong?

• In a usual house, an earthquake first makes,
  • ONE BIG crack,
  • then TWO BIG cracks,
  • then the walls fall out.

In big panels, the energy is concentrated
Small panels distribute the energy evenly

- In a Dhajji house, there are:
  - many SMALL cracks,
  - and only small parts fall out.
- BUT THE WALLS REMAIN!
Friction breaks down the energy
Friction breaks down the energy

• When a frame is deformed, the stones of the infill have to move away.
• When the stones and the boards have to move, they rasp against each other.
• This friction dissipates energy
Only a solid frame can contain the energy.

- An earthquake will put the frame under great stress.
- Take care to make:
  - Good joints
  - Good protection from water
A Dhajji wall is strong because:

- The small panels distribute the earthquake energy evenly.
- The friction between all the small elements and their in-fills breaks down the energy.
- There may be a lot of small cracks which are not dangerous.
- But large destructive cracks become very rare.
STONE FOUNDATIONS
Dasa (plinth beam)

- Anchoring the Dasa to the foundation
- Protecting the Dasa against water and insects
WALL FINISH
MUD PLASTER - COW DUNG PLASTER - WHITEWASH

• No cement Mortar
• Keeps Atmosphere Warm
• Does not get much affected from earth quake
• Roof is slopping to fall down snow.
• Structures are wooden with excellent joinery to bear excessive snowfall and load.
OPENINGS

• Less openings
• Maximum 3’0” opening span
• Mainly in south and South-west Directions

Some old houses have a special type of window which comes out of the wall. This is called ‘dab’. It has beautiful wood pattern. It is wonderful to sit here and enjoy the view!
FLOORING
Mud – Wooden - Carpet

- Keeps atmosphere warm
- Locally available
- Cheap in the Locality
Curtains and upholstery

- Thick
- Dark coloured
- Silk and Woolen
Temporary
House Boat
( Donga)
HOUSE BOAT Donga

- Well planned
- Fully Wooden
- Delicate Kashmiri Wooden carving
- Modern Resources
- Streamlined body

Beautiful carving on wood can be seen on the ceiling of houseboats and some big houses. This design is called ‘khatamband’, which has a pattern that look like a jigsaw puzzle.
LADAKH
SETTLEMENT

PERMANENT 3.5%  SEMI PERMANENT 38.3%  TEMPORARY 56.5%
PERMANENT & SEMI PERMANENT
WALLS

- Sun dried mud bricks
- Rammed earth Panel
- Not perpendicular from ground

- Retain temperature
- Less affected by earthquake
WALL FINISH Mud Plastered - Lime washed

- Creates Germ free atmosphere
- Retain temperature
ROOF
Flat Wooden - Mud Finish

- Flat due to less precipitation
- Insulation from cold
- To dry vegetables and Fruits for cold season
OPENINGS

- Highly Decorated
- Small in Size
- Painted in Bright Colors
- Mostly in South and South-East Directions
FURNITURE

- Wooden
- Minimal
- Highly Decorated Kitchen
TEMPORARY

REBO
MATERIALS

- Black hair of matured yaks
- Wooden Poles
PLANNING

- L x W – As per Family Size
- Height 6’0” or above
- Having Ventilation for chullah
- Having stone toilet out of Rebo called lekha.
QUALITY

- Adverse climatic condition – No wear and tear
- May last for 20-25 years
- Effectively withstand heavy snowfall, rainfall and wind without allowing any leakage or seepage.
- Does not allow temperature change
IMPORTANCE OF STUDYING VERNACULAR ARCHITECTURE

• This type of architecture is the most widespread way to build,
• At least 90 percent of the world’s architecture is vernacular indeed.
• Vernacular architecture proves immensely helpful at times of disaster. When the displaced people are given back homes akin to their vernacular traditions, they recover better from the traumatic experiences.
• Numerous modern architects have intensively studied vernacular architecture and claim to have drawn a good deal of inspiration from it. They have found innovative ways of incorporating them into human dwellings that are "environmentally clean" and "spiritually healthy.”
• With growing interest in earth-friendly building construction techniques, architects are relearning various practical aspects of infusing modern technologies with bygone traditions and cultures. They are actively building upon the knowledge of our grandparents to build homes that would secure our children’s futures. **This is the so called “SUSTAINABLE ARCHITECTURE” or “GREEN ARCHITECTURE”**.
THANK YOU