High attitude indigenous house form of Lepcha community of Rinchenpong, Sikkim, India

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Abstract- The traditional Architecture in Sikkim is a natural response to the availability of local material and local tools, guided by local knowledge system of geography, harsh climatic conditions and deeply embedded cultural practices as well as construction techniques of the region. The architecture that has evolved over long periods of time demonstrates of local resources, constraints, etc.

The paper, on the basis of related study program work in Sikkim, Highlight the local sensitivity towards local builder, materials, traditional methods of construction, cultural transformation. This process exhibits simple yet satisfying ways in which locals and craftspeople of Sikkim have differently evolved Lepcha House form of vernacular architecture.

Keywords – Vernacular Architecture of Sikkim, High Attitude House form, Indigenous House form, Sikkim, Lepcha Community.

I. INTRODUCTION

Figure 1 : Beauty of the North East India.

"Paradise Unexplored", is what North East India is named. With a rich treasure of tradition, it is a delight for tourists, researchers and pride for the inhabitants. North East India has its vernacular architecture which has developed throughout the ages and has been an integral part of its cultural background. Built by the inhabitants building are times tested, sustainable & sensitive to the microclimate conditions and natural calamities, including earthquakes which the North East region is prone to.

Many theorists and distinguished architects like Hassan Fathy have promoted the underlying concepts of traditional architecture to form contemporary design. However, unlikely in the North-East Indian states, the traditional building has been replaced by fast-growing concrete jungles, which are not sustainable or sensitive towards the natural calamities & microclimatic conditions.

These Government of these states need to be sensitive in drafting the local bylaws and planning guideline which promote or allow incentives for usages of traditional architectural form and concepts so that these problems can be tackled meticulously. The first step towards this journey should be a study of the housing typologies of the North East and the basic underlying translated into modern design.

The North East comprises seven sister states- Arunachal Pradesh, Assam, Meghalaya, Manipur, Mizoram, Nagaland and Tripura. Sikkim was integrated into North East in 2002, as the eight sister states. Sikkim, an Indian State on the Eastern Himalayan ranges, is counted among states with Buddhist followers, which had strong cultural ties with the Tibetan region of the Peoples' Republic of China. Because of its past feudal history, it was one of the three 'States' along with Nepal and Bhutan which were known as 'the Himalayan Kingdoms' till 1975, the year of its merger with the Indian Union.

It is a small state with 2, 818 sq. m. (7, 096 sq. km.) between 27 deg. 4' North to 28 deg 7' North latitude between 80 deg. East 4' and 88deg. 58' East longitude. This 113 kilometres long and 64-kilometre wide undulating topography is located above 300 to 7.0 meters above sea level.

The climate of Sikkim is extremely varied largely due to variation in altitude. It has the Himalayan or high mountain type of climate. Altitude is the most important factor controlling the climate and weather condition here. Relief features such as high mountains act as the barriers to the movements of monsoon winds. Low temperature, high rainfall on windward slopes, comparatively dry on the leeward side and heavy precipitation in the form of snow at the mountain top are the main features of the climate here. Due to the great variation in sharp-edged mountains throughout the state, there is a large variation in rainfall and temperature. The Himalayas act as a barrier to monsoon winds forcing them to ascend thereby causing orographic rainfall and snowfall. The Himalayas also act as a barrier to the flow of cold winds from Central Asia, resulting in heavy snowfall on the mountain tops and higher elevations and dry winter season at lower elevation located at the leeward side. The monsoon winds dominate the climate. There is a seasonal reversal of winds almost throughout the state. The monsoon imposes the seasonal rhythm which is apparent in the activities of the people since most of them are agriculturists.

The following four seasons are prevalent based on the monsoon circulation over the state.

1. The cold weather season - December to February
2. The spring weather season - March to May
3. The south-west monsoon - June to September
4. The period of retreating Monsoon - October to November.

Cultural Dynamics

The People of Sikkim consist of three ethnic groups, that is, the Lepcha, the Bhatia, and the Nepali. These myriad Cultures have produced a quintessential Sikkimese Culture that encompasses all ways and walks of life while preserving their own identity. Sikkim has many names. The Lepchas, the original inhabitants, called it Nye-mae-el or `paradise'. The Limbus named it Su Khim or `new house'; while to the Bhutias it was Beymul Demazong or `the hidden valley of rice'. The Nepalese, who migrated from Nepal from the mid-nineteenth century, form the dominant Population.

The Beauty in the culture of the Lepcha people lies in its simplicity. Known as 'born botanist' and "Pure naturalists". They are intensely aware of the surrounding they live in

II. Construction Types

Architecture typologies have developed in the Rinchenpong, Sikkim as factors of tradition, climate and functionality the materials used are locally available materials like bamboo, cane, cane leaves, mud and lime. Of late bricks, stone clips, rock chips, rock slabs, etc. are also being used sloping roofs are a common architectural feature in all architectural typologies.

Kutchha Houses

These houses are essentially made from organic renewable resources such as bamboo, mud, grass, straw, cane leaves, cane etc. the plinth and the foundation consists of consolidated earth with timber or bamboo posts, the walls consist of bamboo mats, split bamboo framing, grass, earth, cane leaves etc., and the roof is thatched, made of wheat or maize straws, with split bamboo framing.

Stone, Bamboo and wooden Houses are seen in the plains of near areas of Rinchenpong, Sikkim with very small changes as per local climates. the material used mostly stone clips, bamboo, thatches for the roof covering, and bamboo/ mud matting for flooring.

Sometimes mud plaster is used over walls mixed with cow dung. In areas with a cloudy and cold climate such as Sikkim, the walls are made of wood or stone masonry to retain heat as shown in typical houses of Sikkim.

A Lepcha house is known as "KAA DEN-MO-LEE". In literal translation 'KAA' means we 'DEN' where we spend our childhood learning the basics, 'MO' centre or main and 'LEE' means home. These Lepcha traditional houses

were built in the 1860s. Built by fore Grandfather Sam Pat Lepcha. Dwagyal Lepcha, the owner of the house is the fifth generation of the family. The Lepcha house was built for 4-5 people to live in. It took 2 years for construction.

Figure 2: A typical Lepcha house of Rinchenpong, Sikkim

Figure 3: A typical Lepcha house of Rinchenpong, Sikkim

These types of houses are mostly rectangular in shapes. There were no separate rooms at that time, only the kitchen and the prayer room. Only the monks used to rest in the puja room and the rest all used the kitchen. These plans and the size of typical houses vary as per requirements.

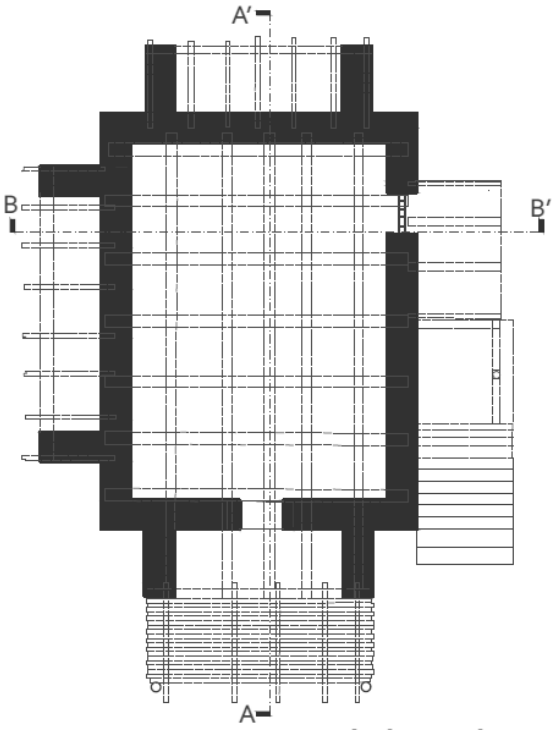


Figure 4: Ground floor plan`

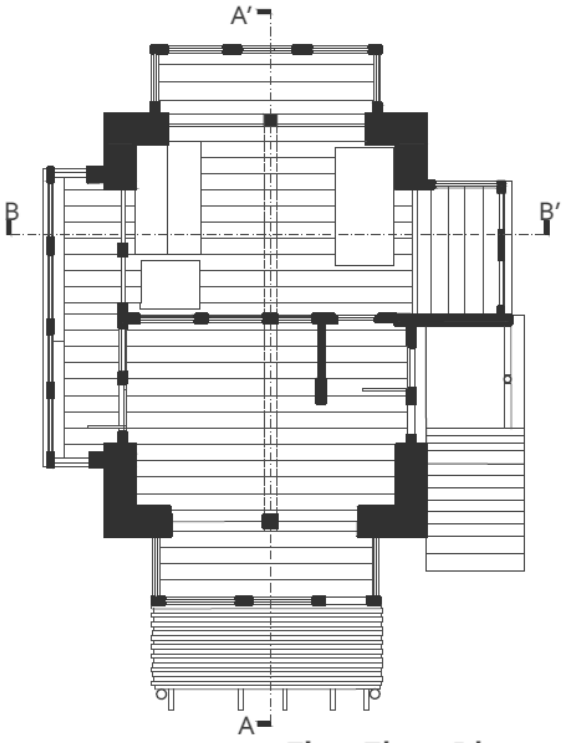
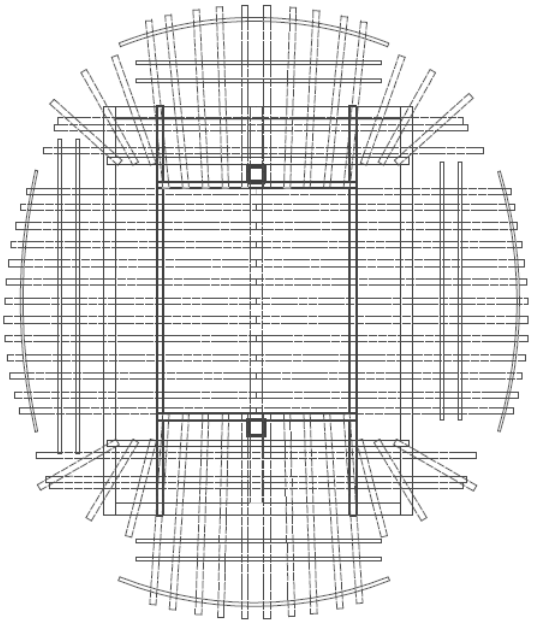


Figure 5: First floor plan

The general Lepcha word for room is “BO”. The first room is the kitchen, sitting and dining and is known as “KAY”. The hearth which is inside this room is called “THOP/ PURTAONG” and central in Lepcha family and social life.



Legends

1. Storage room (Dugong) 4050X5630 mm
2. Staircase (Dupeta)
3. Attic floor (Fulong)

Figure 6: Roof plan

The wooden ladder which acts as a staircase towards the attic is called “TUNGGRAONG”. The attic room which is used for storage is called “PAHLONG”.

The basement room is used to store agricultural tools and chicken and cattle. The small storeroom, also known as boo is used to store private things. The level up in the pooja room was provided for the monks.

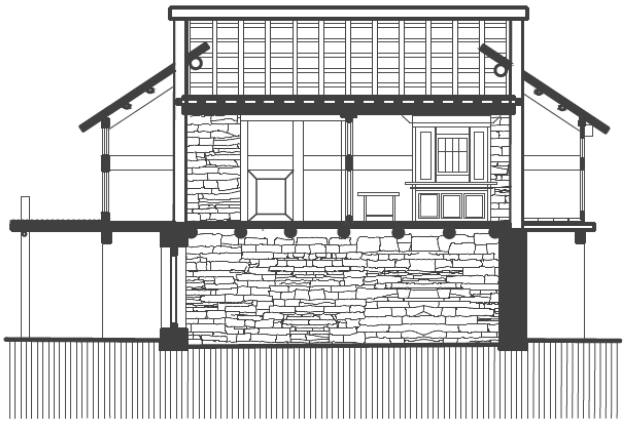


Figure 7: Section AA’

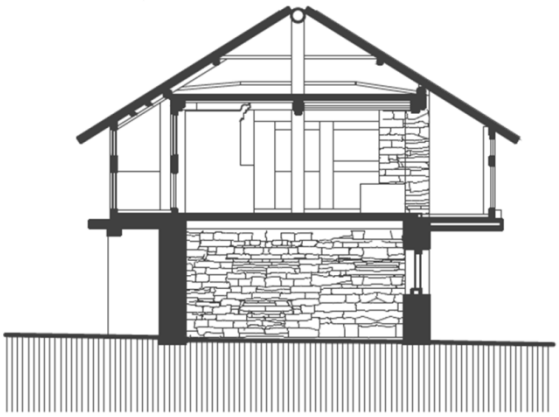


Figure 8 : Section BB’

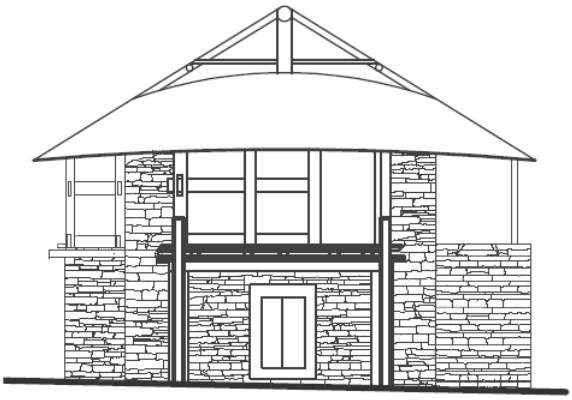


Figure 9 : Front Elevation

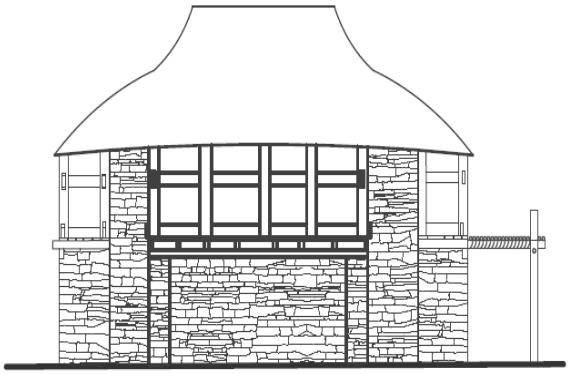


Figure 10 : Side Elevation

The Stilted Lepcha Houses is a typology seen in areas of High precipitation and moisture content both in the air. Construction is done mostly with Stone, Bamboo or wood and thatch for the roof. These types of houses are prominently seen in the Lepcha community in Sikkim.

The stilt height is typically 1.5 to 2.00meters from the ground level. The space below the stilt is often used to store a canoe for emergency usage during floods. The stilted houses are typically designed to keep out the effects of heavy monsoon.

The floor and wall inlays are mostly bamboo weaves, which allows the water of floods and heavy rains to pass rather than getting stored.

The roofs of the house are made by fixing bamboo trusses over the post, over which local grass is laid. The roof height from the weaved floor is approximately 3.50meters. A bamboo loft is fixed below the roof inside for secure storage of goods in monsoon seasons.

Bamboo being a bad conductor of heat keeps the interiors cool and adequate ventilation through the permeable floors and wall keeps the moisture content inside the houses low.

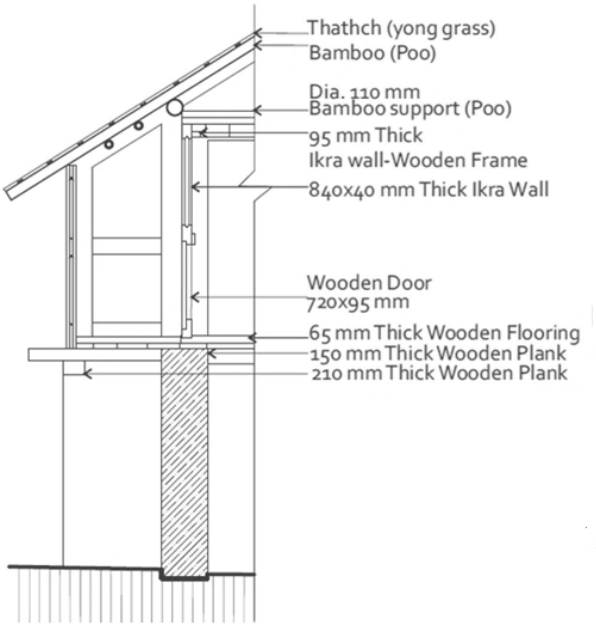


Figure 11 : Wall Section

In a typical Lepcha house construction, the timber posts either embedded into the RCC base, and the house is framed with either timber or Bamboo. The wall infill is Ikra shoots and a mixture of cow-dung and mud plaster over them.

Ikra is widely used as it is less susceptible to insect attacks as compared to bamboo due to the presence of starch and cellulose. Moreover, it bonds very well with mud or lime mortar. Ikra reeds are generally placed in a vertical orientation between bamboo splits of 15 to 40mm width. The mud plaster is then filled in within the gaps of the Ikra reeds and then an overall plaster is done. The connections between the wooden posts and intermediate wooden scants at floor, sill and lintel levels are done using nuts and bolts or with coir ropes.

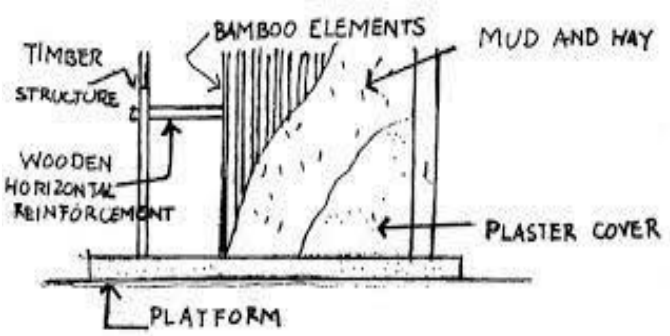


Figure 12: Detail of Ikra application in timber frameworks for typical Lepcha type houses.

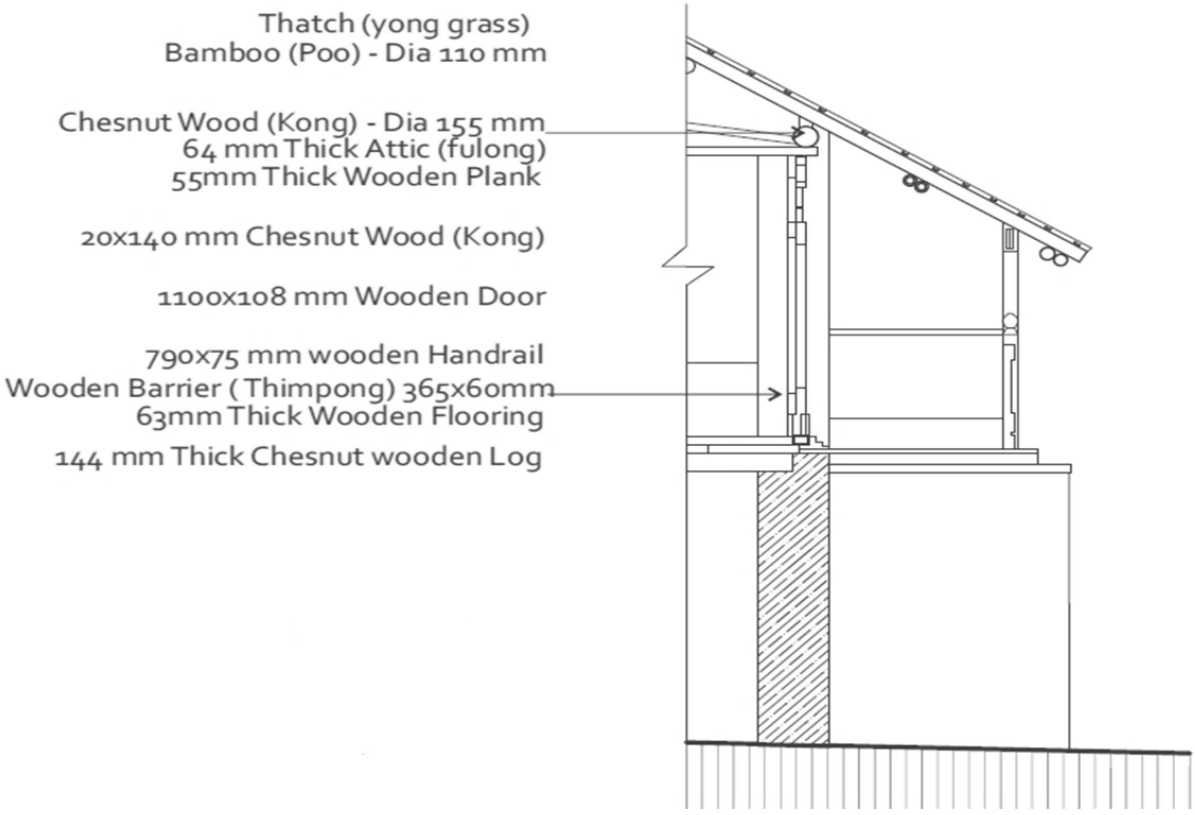


Figure 13 : Wall section



Figure 14 : Ikra wall construction details
Figure 15 : Ikra wall journey at Lepcha House
Figure 16 : Roofing system with young grass thatch

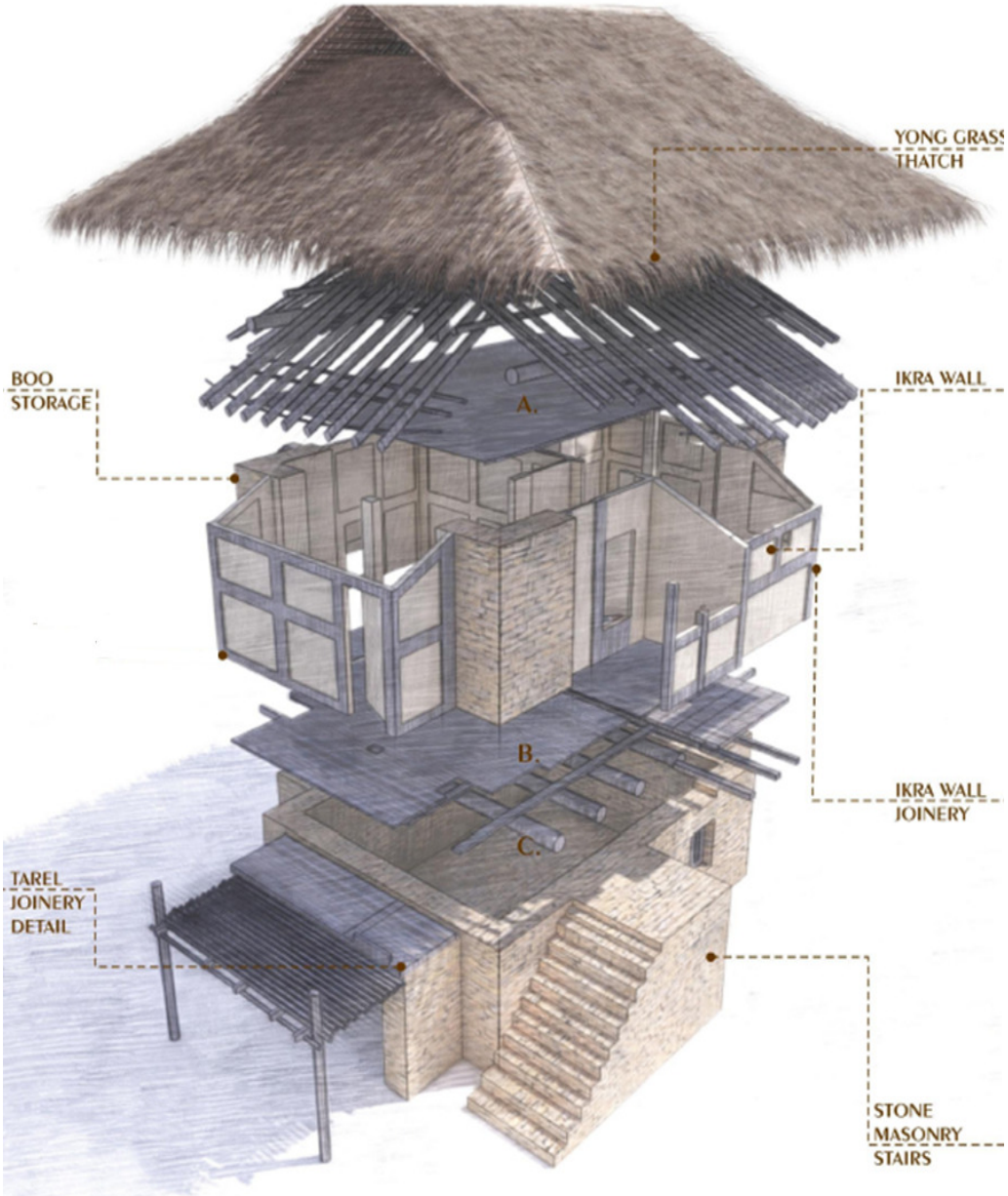


Figure 17 : 3D Model of Lepcha house of Renchenpong, Sikkim.

IV.CONCLUSION

The Architecture High attitude indigenous house form of Lepcha community of Rinchenpong, Sikkim, India relates to the socio-economic setup, the cultural identities and good climatic responsiveness. A good number of climate responsive design features are seen during the study of the housing forms including temperature control, enhancing natural ventilation, protection from natural calamities such as flood, earthquakes etc. However certain features that lack in the Lepcha traditional housing mostly: fire proneness and termite infestation due to usage of non-treated bamboo and wood, lack of damp proofing and use of non-stabilized soil for construction too pose problems like the dampness of walls and washout during rainfall.

Once the construction and design community of Lepcha are aware of the pros and cons of the traditional house form, the advanced construction techniques can be meticulously clubbed alongside to nullify the problems and enhance the advantages. The government needs to frame local bylaws that support the traditional houses of Sikkim and promote incentives to the inhabitants of these houses. The bylaws additionally need to incorporate the special treatment for locally available materials such as bamboo, timber etc. before usage in construction to make them effective for the long run and also slate restrictions in built form and typologies in the hilly terrain and flood-prone areas.

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