

Green Structure and Organic Houses in, North Regions of Iran

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ABSTRACT Certainly, Climate and its conditions have been playing principal roles in shaping any construction, specially shaping houses that it has been the first basic designing factor.

In Iran, it has raised Iranian Architects most challenges in order to provide protection, by inventing structural styles and protective schemes, which are based on natural and accessible materials.

In Southern Shores of The Caspian Sea of Iran, there are current variety styles of the constructing and structuring, in order to make more protection against humidity and so much rainy climate. But one of the most popular and pretty effective style, include the roof called "The Latesar Roof" and the wall called "The Darvarchin Wall".

The Latehsar Roof is a sloping roof with Iranian Truss Structure (which is different with European kind). Boards, used in the roof, are pretty selected from variety of trees such as Oak, Toska, ... and these are stringent by ropes made of plants. Also these houses walls that include Footing and Foundation, contents natural materials, plasters and mortars and ...

However, these houses have shown pretty strength against the climate undesirable conditions, earthquakes, moths..., in comparing with these region modern houses, but their aesthetic aspects are not limited to those factors and these houses are pretty adapted to the climate and nature.

Totally, in this paper structural detail, explaining constructing method stage by stage, used materials, adapted forms to the climate and ... with appropriate photos will be extended. Meanwhile, samples of these houses will be brought, hope to face architects and structure engineers with new horizons.

INTRODUCTION (11-point, bold type)

The Iran Plateau, in the view of climatic division is located in a hot and dry region of the world. So, generally the average of raining is low. But this is a general division and we are faced with different climatic conditions in Iran Country. Geographers have divided Iran to four (4) different regions.

1- The Central Plateau Regions, the more extensive area of Iran (Dry and hot weather).
2- The Mountain and High Plateau Regions (Extreme cold in winter and moderate in summer).

3- The Northern Shores of Persian Gulf and Oman Sea (Very hot and humid weather in summer and moderate in winter).

4- The Southern Shores of the Caspian Sea or North Regions of Iran.

Regional Specifications of this region are;

- a. Much rain in all seasons of the year especially in autumn and winter
- b. Rather high humidity in all seasons of the year
- c. Low difference of temperature between day and night
- d. Wide plant cover

Raining and suitable condition leads to fast and luxuriant growth of plants all over this region and this has had a much effect in kind of traditional building material.

Building form in this region is mostly shaped to protect against too much rain and humidity.

HEADINGS:

In Southern Shores of The Caspian Sea most of the building roofs have slope and it is usually very sharp; in some cases it reaches even to around 100 to 150%. In this Region of Iran, there are current variety styles of the constructing and structuring, in order to make protection against humidity and so much rainy climate. But one of the most popular and pretty effective style, include the roof called **The Latesar Roof** and the wall called **The Darvarchin Wall**, which below we are going to extend their stages of constructing.

A) The Latesar Roof:

This kind of Roof, is used in buildings which, they are constructed in temperate regions of Iran and also in spaces that, are nearby the forests (Figure-1).



Figure-1. The Latesar Roof

In order to execute this roofs, firstly the Zogals (the Reed stems or the boughs of some special trees) are fastened in parallel order and with 30cm distance between them (Figure-2), to the truss and then the Lat Boards (which are produced by fragmenting the woods of Tosca Tree or Oak) are posed regularly on the Zogals (from down to up), in a type that each upon row is posed on underside row and covers it more than of it's half (Figure-1). Hence in rainy whether, the rain is conducted from up to down, so there are no rain penetration to building inside.

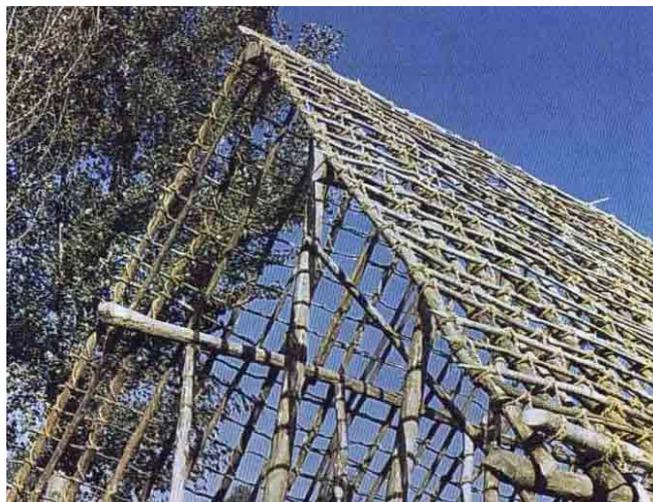


Figure-2. The Latesar Roof Structure

Meanwhile the kind of Iranian Truss (Figure-3) which is used in these buildings is different with European Truss (Figure-4) and the main difference is that internal timbers of Iranian truss are horizontal & vertical but in European kind they are crisscross. The advantage of Iranian type is that, the space under the truss can be used as an extra space for the room space or for storage functions but their disadvantages is belonged to their less persistence against earthquakes and other lateral forces such as winds.

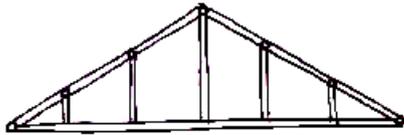


Figure-3. Iranian Truss

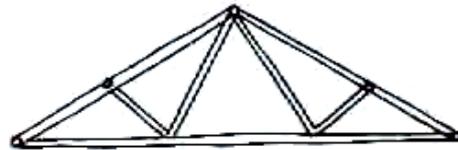


Figure-4. European Truss

For providing more safety, when the Lat Boards are going to posed on each other, 0.5-1cm empty distance is regarded between them; to The Lat Boards do not make pressure and any movement to each other, while they get expansion in rainy whether. The most important point is that, they are no junction between the Lat Boards; therefore for hard keeping them on each other, usually the Cobblestones are posed on them to produce more weight, although if the wind blow or earthquakes be powerful, they can not persist against them.

In Iran the Lat Board sizes are not standard but 1-2cm thickness and 25*40 (L&W) is most current. These kinds of roofs don't show appropriate persistence against climatic undesired effects and they are dry and so much breakable under sun shines. The rain causes growth of the brushes which are harmful for the Lat Boards and putrefies them. But totally these kinds of roofs are most current in these regions and also they are used in the important buildings constructions more than the houses.

B) The Darvarchin Wall:

This kind is used in region which the wood is so much accessible over there, such as temperate regions and forests. The constructed buildings with the Darvarchin Walls have just one floor and one room also they have been constructed with the Latesar Roof (Figure-5).

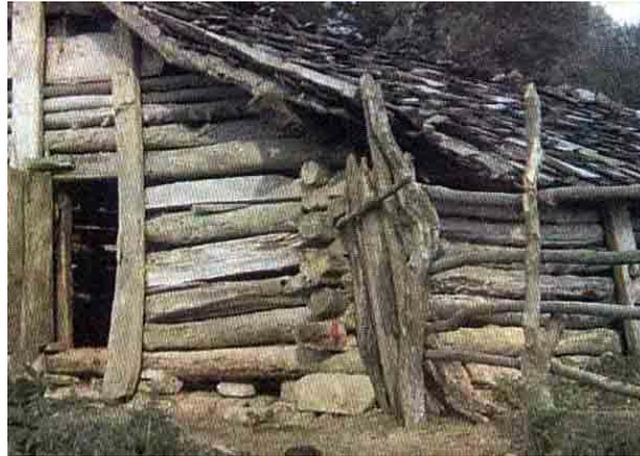


Figure-5. The Construction made of Darvarchin Wall

For executing these walls, firstly the building area and the places of walls should be determined and some quantity of wall subs soil be removed and the empty spaces be filled with Cobblestone and almost with rough stones, hence the ground humidity was not be able to wall's woods. The last row of stones should be posed as slighted to timbers stand exactly with horizontal level.

In order to produce more persistence against lateral forces, the junction of the timbers is point able. It is obvious that in this method between of the double timbers will be empty as one timber as (Figure-6).



Figure-6. The Junction of the Timbers

Hence that space will be filled with Thatch to protect and save internal temperature (Figure-7). After finishing timbers posing, a wooden Truss covers the construction, which itself has been covered with Lat Boards.

In these construction as scarce, is found any window and the air conduction flows from timber's holes or the door's holes.

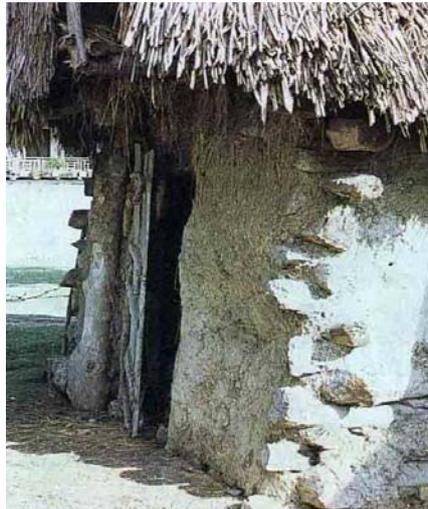


Figure-7. The Darvarchin Wall filled with Thatch

However, these constructions have shown pretty strength against climatic undesirable conditions, earthquakes, moths..., in comparing with these region modern houses, but also these houses are pretty adapted to the climate and nature.

CONCLUSIONS:

From the researches conducted in this ecological area of Iran, it is concluded that the main factor for Iranian architects, in making plan for buildings and their forms, the ecology and facing against it, is considered and their efforts have lead to their inventions.

In most cases it can answer stable architecture contexts. It should be noted that Iranian architects have fought against different ecologies by their making plans for the form and shape of building and not by using equipment and facilities which are installed in the building and in addition to making disturbing noises and life risks, they destroy the environment.

We hope that this article could attract the attention of all building contractors to this kind of regional (ecological) architecture, its appearing and extension

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Cultural Heritage Organization of Rasht city in Gilan Province