

## Ivan: Creator of Sustainability in Iranian Old Houses

Javad Eiraji, Pouya Joudi Gollar, Ayub Nalbandi Bukani

(Javad Eiraji, Member of Architecture Scientific Association, Faculty of Architecture, Tabriz Branch, Islamic Azad University, Tabriz, Iran, j.eiraji@yahoo.com)

(Pouya Joudi Gollar, M. A., Faculty of Architecture and Urban Planning, Sh. Beheshti University, Tehran, Iran, pouya.joodi@gmail.com)

(Ayub Nalbandi Bukani, Member of Architecture Scientific Association, Faculty of Architecture, Tabriz Branch, Islamic Azad University, Tabriz, Iran)

### 1 ABSTRACT

This paper introduces and focuses on an Iranian architectural element which has been designed to have the solutions of human comfort and use and save natural energies. A free and smart element which like a layer in front of the main body of buildings appears and prevents the direct sunshine to the building and like a cover creates shadow and a cool atmosphere in front of the main building and by this way, it has been as the creator of sustainability in Iranian architecture. First of all we will have an introduction and history of this Iranian invention and then we will focus on its climatical values and then its effects on architecture of old houses in Iran.

### 2 ARCHITECTURE AND SUSTAINABLE ENERGIES

Sustainability and the ways of uses of natural and renewable energies, is one of the most important cases which should be paid attention alot. Houses are one of the main consumers of energy in urban scale which paying attention to their details and the correct ways of their architectural design, can reduce the nonrenewable energy uses and increase the natural energy uses and sustainability. In fact, architecture and a fine design can save energies and human and the correct way of uses of energies can save architecture and human again.

### 3 IVAN

Before coming to the architectural details of Ivan and its relationship with energy, we will have some descriptions of what the Ivan is in different definitions. In some traditional believes, Ivan is an element to separate the outside and inside of a place or atmosphere [1]. In an other definition, it is like a space in front of a building with some columns [2]. In fact, it is an element to create shadow and was used as a tool to make connection between the house itself and natural atmosphere of outside [Fig.1].



Fig. 1: Ivan, an element of Iranian architecture in front of an old house

It should say that Ivan was not just used as an element of houses. It was also used for some other public traditional and religious buildings of Iran such as mosques or even for some governmental buildings such as palaces, but as its main sustainable effect was shown on houses, this research is focusing on houses and their sustainable potentials. As the history and the researches show, Ivan is an Iranian invention which was used in this country from their ancient kingdoms such as Achamedian and Ashkanian [3], but the main uses of this element in the houses started in Iran in Safavi and Qajar period.

As the main land of Iran includes the hot and dry region, So it was necessary to create some things to provide the coolness and prohibit the hot weather and it has some columns and also it was usually decoered by some Iranian decorative organs [Fig.2].



Fig. 2: Ivan, with decorative organs and columns

#### 4 IVAN, ARCHITECTURE AND SUSTAINABILITY

During focusing on sustainability details of Ivan, we should pay attention to both beauty and functional aspects of it too. Ivan was used as a lateral architectural instrument to increase the beauty of the building, but the main use of that was its functional aspect and its sustainability creating. The South side of houses need to have enough natural light as the living room of Iranian old houses called "Tanabi" is usually designed in this side but in some parts of this hot country this sunshine and natural light can cause some problems and if there is no shell in front of this hot side of houses, inside of houses will be so hot. So, we need to save the natural South light without making inside so hot too [Fig.3].



Fig. 3: The beauty and functional aspects of Ivan

Making somewhere cool or hot needs energy, and this energy should be provided. Iranian traditional architects had tried to use natural energies in their most designs and by this way, they were making a house

or any other building sustainable. Ivan, like a shell in front of the houses, with its climatic effect, creates an environmental conditions and a spatial variety. When it's in front of a building, as it is not like a rough wall with some simple windows, it invites the natural lights inside as much as it's possible and by creating the shadow makes the main body of building and also the middle space cool [Fig. 4].



Fig. 4: Ivan and the middle space between it and the main body of the building

By designing and using this element, without burning fossil and nonrenewable energies, Ivan uses natural energies and creates shadow and makes the house cool without decreasing the light inside.

## 5 CONCLUSION

Having two or even more benefits together beside each other makes the architectural design process hard, but Ivan makes this request easy. It makes the Iranian old house beautiful, it causes to have the natural light inside and also by using the natural energies and making the building cool causes the sustainability for Iranian old houses and this traditional element can be used as a pattern for today and also future architectural design to save the energy sources.

## 6 REFERENCES

- [1] N. Ardalan, L. Bakhtiari, *The Sense of Unity*, Khak Nashr, Tehran, 2004.
- [2] M. Zandieh, S. Parvarinejad, *Sustainability and Its Meaning in Iranian Residential Architecture*, Roosta, Tehran, 2010.
- [3] M. Shirazi, *Tabriz Old houses*, Memari and Sakhteman, Tehran, 2007.
- [4] G. Memarian, *Iranian Traditional Architecture*, Elmo Sanat, Tehran, 1997.
- [5] M. Keynejad, *Tabriz Old Houses*, Farhangestan-e-Honar, Tehran, 2011.