



---

# COMPARATIVE INVESTIGATION OF INTELLECTUAL SYSTEM OF HOUSES BASED ON ISLAMIC-IRANIAN MODEL AND PASSIVE DEFENSE

**Amirhossein Rahmati dehkordi\***

Young Researchers and Elites Club, shahrekord Branch, Islamic Azad University, shahrekord, Iran: Department of Architecture Group, Faculty of Art and Architecture, Shahrekord Branch, Islamic Azad University, Shahrekord, Iran

\*Corresponding Author

## ABSTRACT

*Islamic-Iranian architecture with its regional characteristics and scientific components is considered among sustainable architectures of all time. Passive defense as one of the most important solutions is proposed for sustainability and maximum utilization of architecture capacity. In this study, the relationship between Islamic-Iranian architecture in Iranian houses and passive defense has been taken into consideration. The research method was library research method and descriptive and analytic.*

**Keywords:** Islamic-Iranian, house, passive defense, intellectual system, security

**Cite this Article:** Amirhossein Rahmati Dehkordi, Comparative Investigation of Intellectual System of Houses Based On Islamic-Iranian Model and Passive Defense, International Journal of Civil Engineering and Technology, 8(11), 2017, pp. 153–163  
<http://www.iaeme.com/IJCIET/issues.asp?JType=IJCIET&VType=8&IType=11>

---

## 1. INTRODUCTION

A building is considered as a sustainable work when the main principles and promotion of life quality are taken into consideration, so that any idea to shape human life should be concentrated for maximum utilization.

## 2. STATEMENT OF THE PROBLEM

House, as a place in which a set of behaviors are developed according to the conditions and people spend most of their life in it, is very important compared to other constructions (Amini et al., 2013). Localization and climatic conditions, tendency toward people-centered architectural space, observing dignity and privacy of people, confidentiality, and veil are taken into consideration in Iranian architecture. In Iranian architecture, the prominent aspect is that the architecture space is in the service of humans and people solve their problems in this type of architecture very well and feel the inner essence of the architecture.

Privacy is one of the main needs of human. Indeed, each person requires privacy and a domain regarding physical, emotional, and mental aspects and if the privacy is not provided, the person will face some challenges. Privacy can be individual (relationship with God and praying) or collective in religious places such as church and mosque. In this condition, although the person is among other people, he has his own privacy and relationship with God (Asgharzade and Mobaraki, 2009). Another aspect that is taken into consideration in this study is passive defense and it is attempted to investigate it. Finally, the relationship between Islamic architecture and passive defense in houses will be investigated.

### 3. SIGNIFICANCE OF THE STUDY

One of the most important necessities of this study is restoration and rehabilitation of the values that were important for people in the past but are not taken into consideration anymore. Human wants a house that can provide peace where his privacy is observed. House provides a relationship between human and his environment. Meanwhile, another issue that signifies the importance of this study is security that is introduced as passive defense and is very important due to seismicity of Iran.

### 4. TERMINOLOGY OF NOBILITY AND PRIVACY CONCEPTS

Different houses in different periods of time, despite the differences that show, have a mutual principle that is separation between inside and outside and creating a safe place for family members. In the first studies on this issue, the necessity of privacy is classified as follow in Table (1):

**Table 1** Classification of need to privacy in Islamic-Iranian houses

Row	Title	Descriptions
1	Relationship	One reason that human is looking for privacy is the protected relationship. If it is not possible to find a certain place to speak with a certain person, most of important exchanges do not occur.
2	Security	The physical environment has an important role in enhancing mental security of the person and positive or negative mental contexts can influence the total feeling (Zabetian et al. 2008). Meanwhile, attention to privacy is concentrated on the principles that form the security of the space and provide safety and comfort of people.
3	Sense of belonging	The life of human society is based on the sense of belonging and the relationship between people. Generally, the main goal of each society is to protect the relationship between people and the sense of belonging that put the people together. Territory is created by people to create sense of belonging (Atarha and Danaeinia, 2016). Studies show that there is a relationship between privacy and sense of belonging, so that by creating privacy, the performance of the group improves and sense of belonging
4	Independence and satisfaction	Privacy regulation is the basis of independence. Privacy as a control process includes limitation and search for interaction to achieve a desired degree of access to the self or group in a certain time within the available conditions. Provision of controlled interactional levels can provide satisfaction for the users.
5	Control	Privacy facilitates sense of control of people. Those who are alone have limited control over their physical and social environment that leads to elimination of independence and autonomy.
6	Identity	Illusion of privacy functions as a facilitator to recognize identity.
7	Feelings	The fourth function of privacy is to allow expression of feelings, so that privacy functions as an instrument to express feelings.

## 5. INTELLECTUAL SYSTEM IN ISLAMIC ARCHITECTURE

Islamic architecture is taken from Byzantium, Persia, and India. In this type of architecture, for intellectual systems and concepts are integrated that are presented in Table (2).

**Table 2** Classification of intellectual systems and concepts in Islamic architecture

Row	Title	Description
1	Intimacy, beauty, comfort	Here, by rejecting any aspect that deviates the concentration of the residents, a special atmosphere is created.
2	Unity in diversity	Unity in diversity by no means is repetition and unity, but refers to collaboration and unity of components to reach a common goal. This principle is the foundation of other principles.
3	Social benefit	Accordingly, Islamic architecture is an effort to satisfy common needs; therefore, it considers both sides of human existence.
4	Certain decorations	In the past, Muslim architects were considering all beautiful phenomena around themselves and were would do their best to manifest it in the mosques.
5	Specific and pure geometry	Three factors of the penetration of Islam, Medina Mosque model, and tradition to use the central yard led to consider the central yard as one of the main components in building mosques.
6	Islamic architecture geometry	Islamic architecture geometry is the connection between material and meaning, earth and sly, and privacy and manifestation. The artist, using regular and geometric forms, tries to present a beautiful image from the crystalline ordering of the world and people. Therefore, the forms are in their perfect aspects.
7	Orientation	The direction for the Muslim architect is meaningful and motivating. Islamic scholars reject objects that are without orientation.
8	Symmetry	Muslim architect uses symmetry in order to facilitate development and continuation of melodic ideas in the mind of visitors in a masterful way.
9	Opposite encounter in external and internal spaces	We know that in our spiritual wisdom, elixir functions the same as governance. Therefore, two movements that interpretation circle is opened and closed by them consist of the end of prophecy circle and initiation of province circle.
10	Message continuity	Generally, religious art focuses on the meaning of the message, because it looks for human happiness. For this purpose, different measures are used to inform people.

## 6. TYPOLOGY OF OLD HOUSES

Iran is one of the few countries in the world that has indicated a variety of architectures in its history. Cultural and geographical characteristics of Iran have created diversity in its architecture, but in general, Iranian architecture can be divided into intrinsic and extrinsic types that are pointed out in Table (3).

**Table 3** Typology of old houses

Row	Title	Description	Sample
1	Extrinsic	Characteristics such as direct visual and physical relationships with the outside of the house, lack of yard, development on the heights, and spatial organization relative to another space	Houses in the north of Iran, for example Masule and Abianeh

2	Intrinsic	No direct visual relationship with external urban spaces, organization of different spaces such as yard, so that openings are toward this component.	Houses in arid and hot and humid regions
---	-----------	--	--

## 7. TYPOLOGY OF CONTEMPORARY HOUSE ENVIRONMENTS

For typology, all Iranian houses are extrinsic and criteria including 60% construction at the surface level are dominate. The characteristics of these houses include open plan, large windows and numerous openings without considering the climate, the importance of stairs, lack of respect for the nature, lack of attention to proper use of energy, use of advanced materials such as cement, glass, metal, and constructional operations, or mechanical equipment. However, experts were not employed sufficiently.

Characteristics of the contemporary houses include:

1. In these houses, everything is predicted and objects guide us, not the environment.
2. The house is marked out and this distinction is resulted from height, materials, color, parking, yard, walls, and stairs.
3. Moving in the space and spatial combination is very limited and does not have any certain direction.
4. Lack of spatial personality, especially internal space and interference of this space with other parts.
5. Spatial organization of the house does not satisfy the needs of residents.
6. Failure of public spaces.
7. Limitation of spatial variability and low quality of presence in this house.
8. Inability of spatial organization in controlling environmental and natural conditions.
9. No use of nature.

## 8. THE RELATIONSHIP BETWEEN ARCHITECTURE AND PASSIVE DEFENSE

The arrangement of spaces and their relationships can improve the performance of system and decrease damages. Determination of geometric design, the location of openings, accesses, and prediction of secure space for each building in different conditions are the responsibilities of the architect. The architect should design the building according to the use and requirements that in addition to passive defense performance, show suitable application during peace.

By the origin of the building it means a location to build the site and a set of buildings that include all required operations to achieve the final goal (Haeri, 2009; Pakhshcherani and Karimi, 2016). Therefore, in this regulation, two dimensions are taken into consideration; first, the effects of waves and second, the relationships between components, that is interaction of components and their effects on each other and other components such as door, window, fence, and covers. Therefore, a sustainable set is created against the indirect effects of explosions. Accordingly, to achieve this purpose, the considerations of passive defense should be taken into consideration. Also, they should be coordinated with other principles of architecture.

**Table 4** Description of each components (Razavinasab and Yousefi, 2016; Eskandari and Maleki, 2016; Pourjamshid, 2016).

Row	Title	Description
1	Environment	The design of the environment based on the principles of passive defense includes design based on rapid direction of people considering decreased risks of destructions. Therefore, at this stage, direction is accompanied by acceptable confidence and speed against air strikes or rockets compared with common buildings.
2	Locating the building	In residential complexes of groups 2 and 3, it is necessary to distribute the activities in homogenous way and prevent their accumulation in a certain location due to their vulnerability. In order to decrease the risk of destruction, the width of paths to access to the buildings should be one third of the height of buildings.
3	Entrance	Emergency entrance dimensions are a function of width (people, vehicles), traffic, direction and the type of vehicle are considered in this environment.
4	Access Paths	Destruction resulted from explosion due to the expansion of green space, typologies, diameter, and age of trees decreased.
5	Stairs and Ramps in The Area	The dimensions of stairs in the open space to prevent accidents for people and easy of discharge and scape should be as follow: The width of stair at least should be 1.5 m The height of stair at last should be 17 cm The minimum effective stairs floor should be 30 cm
6	Materials	The materials of the external wall consist of cement or steel or a combination of these two, so that against explosion, they can be resistant. Concrete vertical edges provide the possibility for lying.
7	Building Volume	The form of building should be symmetrical and in the case of destruction, prevent destruction due to imbalance.
8	Assignment Components	Installing assignment components such as doors, windows, and panel are not allowed.
9	External Wall of The Building	Using fragile components that constitute more than 30% of the façade such as door, window, fence, panels and installed equipment on the roof are not legal.
10	Safe Place	In order to protect the explosion effects, safe place should be considered in each plan.
11	Shelter	One of the necessities in passive defense is that its details should be designed according to the standards.
12	Emergency Exits	Emergency exit should be connected to the shelter through a 90 degree bending and pothole in downstream that functions as a place for potential destructions and waste water disposal.
13	Resistant Construction Against Explosion	The effects of direct explosion are damages that occur due to the pressure of explosion at initial moments. This may lead to local damages of external walls, windows, roof systems, columns, and foundations. Progressive destruction of the primary local damage moves from one member to another member.

## 9. COMMON SYSTEMS TO OBSERVE PASSIVE DEFENSE IN THE WALLS

In the case of solid walls, the loads should not be transmitted to the columns. It is likely that the details of connection in the construction are very complex. Installation of all blocks on the

fittings is a suitable method to provide required lateral fixed end. The use of external wall that keeps the roof is a suitable method (Bastani and Fateminejad, 2016). In order to increase protection, 30 cm blocks with two layers of vertical armatures are used. This form of buildings can be designed for resistance against weak explosive loads (De Chiara, 2001).

## 10. CONCLUSION

This study aimed to extract the relationship between passive defense and Islamic-Iranian architecture in residential houses. By investigating Iranian architecture, the main indexes of design were extracted. According to this study, it can be concluded that most of passive defense principles are based on Islamic-Iranian architecture that should be taken into consideration in designs. For example, the width of alleys is not suitable to let firefighting cars pass through them. Therefore, those architects that aim to follow Islamic-Iranian architecture, should take passive defense into consideration.

## REFERENCES

- [1] Amini D, Hoseini H, Selaki H. Urban housing from the perspective of passive defense, the 2<sup>nd</sup> conference on environmental risks, Tehran, Kharazmi University. 2013.
- [2] Asgharzade A, Mobaraki H. Privacy of woman, national conference on women and architecture, Tehran, 2009.
- [3] Zabetian E, Bemanian M, Rafieian M. Safety for women in urban spaces and their participation assessment in the central part of Tehran, 2008.
- [4] Atarha M, Danaeinia A. Reflection of path identity in architecture based on word morphophonemic, International Conference on Urban Engineering, Ghom.2016.
- [5] Khajoe K, Danaeinia M. Investigation and classification of desirability indexes in housing. International Conference on architecture, Tehran. 2016
- [6] Haeri M. Investigating historical and contemporary houses, urbanism and architecture studies, 2009.
- [7] Pakhshcherani M, Karimi A. Passive defense and architecture in designing and increasing defense capabilities, Ardabil. 2016.
- [8] Razavinasab H, Yousefi S. Passive defense and designing embassies, the 3<sup>rd</sup> international conference on science and engineering, Turkey. 2016.
- [9] Eskandari N, Maleki J. Urban safety with passive defense approach, the 1<sup>st</sup> international conference and the 3<sup>rd</sup> national conference on architecture and sustainable urban perspective, international institute of architecture. Mashhad. 2016.
- [10] Pourjamshid N. Passive defense in urban planning, the 1st international conference on natural risks and environmental crises, solutions, and challenges, Ardabil.2016.
- [11] Bastani J, Fateminejad Kh. Crisis management using passive defense: decreasing vulnerability of urban areas, the 1st conference on natural disasters and environmental crises of Iran, solutions and challenges, Ardabil. 2016
- [12] De Chiara J. Time-saver standards for building types. McGraw-Hill Professional Publishing; 2001 Apr 1.
- [13] Noraldin Pirkhezri. The Role of the Metal Roof in Creating the Passive Cooling In First Western Houses (Bengale): A Case Study, International Journal of Civil Engineering and Technology, 8(8), 2017, pp. 1130–1140.
- [14] Rana Mazin Mahdi, Enas Salim Abdul-Ahhad, Hussam Jabbar, Modernization of Architectural Heritage (Applied Study of Heritage Islamic Architectural Elements in Iraq). International Journal of Architecture (IJA), 3(2), 2017, pp. 10–17.