ROOFS FUNCTIONS IN VERNACULAR RESIDENTIAL BUILDINGS
Case Study in Kashan, Iran

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Abstract
The vernacular roofs in Iran served more than protective functions and were in response to the people’s behaviors. The case study has explored the different functions of the vernacular roofs regarding the people’s behaviors. It has focused on Kashan, as an ancient and historical city with hot and dry climate. The semi-structured interview has been conducted among the local master builders and experts, which respondents have answered to the open-ended questions. As the results show climate, religion, culture and economy affected people’s behaviors on the roofs and caused creating spatial, socio-cultural, spiritual, economic, recreational and passage functions of the roofs. In response to these functions, particular roofing strategies emerged, including aligned and connected roof, flat and double surface roof, staircase, partition walls around the roof, and some spaces on the roofs. Consequently, the vernacular roofs were in response to the people’s behaviors, improved physical and mental health, offered spiritual and intangible benefits. The study recommends professionals consider the people’s demands and behaviors during roofing in order to use all the potential of the roofs in residential buildings.

Keywords: People’s behaviors; Roof functions; Vernacular roofing; Residential buildings.

INTRODUCTION
People who mainly live in contemporary apartments consider roofs as final surfaces of the buildings, which are full of installation pipes, chimneys and heating or cooling equipment (Haeri, 2010), whereas, roofs in the vernacular residential buildings (VRB) of Iran acted as main spaces in the past (Fallahfar, 2007). The vernacular roofs served more than protective function in the urban areas and were efficient and open spaces in the VRB, which occupants could take advantage of them (Sadeghipey, 2011). They acted as public, social and cultural interaction spaces, living and resting areas, and workplaces. Roofs in Iran acted as open spaces in the VRB and provided living activities for occupants in the summers (Mirmoghtadaee, 2009). The eesidents slept on the roofs at nights and watch the stars (Sadeghipey, 2011). People in the past were responsive to their neighbors, helped them in difficulties and performed communal activities (Esfahani, 2004). Hence, the vernacular roofs provided the possibility of neighbors’ communication (Haeri, 2010) (Fig. 1). Furthermore, the vernacular roofs were used as recreational spaces and people kept, bred and flied domestic pigeons on the roof as a hobby (Fallahfar, 2007) (Fig. 2).
In addition, the roofs of the VRB improved interaction of human being with the environment. People used the roofs for taking the advantage of natural resources and providing thermal comfort. The vernacular roofs were used for sun drying purposes. People could dry their washed clothes, carpet, fruits, vegetables on the roofs (Sadeghipey, 2011). Likewise, according to the occupation of the residents, the roofs in the VRB were used as places for producing dried fruits or drying the dyed yarn on the roofs (Fallahfar, 2007) (Figs. 3 and 4).

Figure 1. Watching religious ceremonies on the roof, Masooleh, Gilan, Iran (Source: Amin Karami, 2013)

Figure 2. Pigeon fanciers used the roofs for keeping and flying pigeons as a hobby (Source: Mohsen Mazaheri, 2012)
Figure 3. Producing dried fruits on the roofs, Zenoozagh Village, Eastern Azerbaijan, Iran (Source: Hamed Haghdoust, 2009).

Figure 4. Hanging and drying the yarns on the roofs by dyers (Source: Saeed Mahmoodi, 1999).
Iran is a vast country with a variety of climatic conditions. This study has focused on the hot and dry climate, which included a large proportion of the country. Diversity of climatic responsive strategies in architecture (Jamshidi, Yazdanfar, & Nasri, 2011) has been characteristic of these regions. In hot and arid regions, the VRB were built compactly and closely together in order to reduce sun-exposed surfaces and consequently, to avoid heat penetration through the building enclosures. Hence, the roofs were connected (Zargar, 2007) and provided passing across the roofs and watching the city (Haeri, 2010). The study has selected Kashan, as an ancient and historical city with hot and dry climate (Jamshidi et al., 2011) to explore the different functions of the vernacular roofs regarding the people’s behaviors in this area.

CHARACTERISTICS OF ROOFS DESIGN IN VRB OF KASHAN

Kashan is located at the center of Iran and its climate is similar to desert with significant changes in temperature between night and day. The weather is hot and dry most of the year (Taleghani, Behboud, & Heidari, 2010). The study has considered the roofs of the VRB in Kashan, which were built between 1778, before the great earthquake, and 1920. The design of the buildings was, according to the climate. Characteristics of the VRB in Kashan were introverted houses with minimum openings, vents and windcatchers on the roofs, arches and vaulted roofs (Jamshidi et al., 2011). Types of the roofs varied according to the function and size of the below plan (Memarian, 2012). Flat, domed and vaulted roofs were different types of the roofs in this region (Fig. 5).

The VRB were built closely in order to reduce sun-exposed surfaces, hence, the roofs were connected. Moreover, the roofs were built with around 30-40 centimeters thickness in order to avoid heat conduction. Brick and adobe were the best choices in response to the hot weather. Moreover, a mixture of mud and straw was common roofing layer in this region, which straw mainly

Figure 5. The different forms of the vaulted roofs in the VRB of Iran, Abbasian house, Kashan, Iran (Source: Authors, 2012).
acted as a proper material against heat transfer (Zargar, 2007). Additionally, due to the saving energy of bright color roofs (Jamshidi et al., 2011), light brown color of mud and straw was an appropriate choice for the hot regions, which mitigate radiation and avoid glare. Double surface roofs were used in this city to save the heat during the day and discharging it at night (Moradchelleh, 2011). High and sometimes lattice parapets were built around the roofs in order to create shadow and consequently, reduce heat convection during the day (Zargar, 2007). Consequently, connected roofs, thick and the double surface roof, made from high thermal mass materials with windcatcher were roofing strategies in the hot and arid climate. After describing the roof characteristics in Kashan, there is a need to investigate the people’s behaviors on the roofs.

METHODS
This study has selected qualitative approach as a research methodology and according to Strauss and Corbin (2008), the important reason for choosing this method is entering into the world of the interviewees in order to gain their experiences and perspectives, discover and explore. The single case study as a research approach has been chosen for the study that has enabled exploration of the phenomenon within its context, using a variety of data sources (Yin, 2009). Kashan, as an ancient city with 7000 years history, has been selected as the single case study. The case study is an appropriate research method in this study to contribute to the knowledge of local master builders, and experts for understanding the roof functions in the VRB of Kashan regarding the people’s behaviors (Yin, 2009). Hence, the local master builders and experts have been the units of analysis in this case. Data collection procedure has been conducted in the city of Kashan. Semi-structured interviews, documents and literature review have been different types of the qualitative data in this study.

Interviews
This study has used semi-structured interviews, which respondents have answered to the open-ended questions. It has been a face-to-face data collection and usually conducted in their office. One-on-one interviews has been a proper approach due to the ability of the interviewees in speaking and sharing their ideas, as well. Text data have been gathered through transcribing of audiotapes, which recorded during the open-ended interviews. Information has been recorded by informal notes and self-designed protocols in order to organize responses for each question. This study has used gatekeepers in order to provide the opportunity of obtaining permission from respondents for interviews. This type of sampling is useful for exploratory purposes and when locating interviewees is difficult (Babbie, 2012). Regarding Creswell (2008) suggestions, snowball sampling as a strategy of qualitative purposeful sampling has been used after the beginning of the research in order to ask interviewees to introduce other respondents through informal conversations. Interviewees have suggested other experts or master builders who can help in discovering the functions of the roofs regarding the people’s behaviors and providing information about it. Hence, the selected respondents and cases have been information rich and illuminative (Creswell, 2008; Patton, 2002).

Participants
The interviews have been conducted with the local master builders and experts, who involved in the preservation and renovation of the VRB of Kashan, to understand the people’s behaviors on the vernacular roofs from their opinions and perspectives. Their specialty has allocated for reconstructing and renovation of the VRB in this city. The identified master builders and experts for interviews have been a public-recognition and famous in the city for their experiences in the reconstruction and renovation of the VRB. The residents and public were not an appropriate choice for an interview. The residents of the VRB mainly have died and new generation and public mainly
are young and not information rich. Therefore, the local master builders and experts have been an appropriate choice for interviews.

Due to the limited number of knowledgeable master builders and experts in this scope, few interviews have been conducted. Nine interviewees, including master builders and experts have formed samples of the research, which four participants with 20-30 years experiences have been experts in the preservation and renovation of the VRB. Five respondents have been master builders with 20-30 years’ experiences in reconstruction and renovation of the VRB of Kashan. The picked master builders and experts have played major role in understanding the people’s behaviors on the vernacular roofs. Their knowledge has been informative and educational. The master builders and experts have been coded and their profession has been indicated in table 1.

Respondents have been free to respond to the broad, general and open-ended questions and declare their views and experiences. The answers have been recorded, simultaneously. The responses have been transcribed, translated, and typed into the computer for later analysis. Although the interviews have been planned, respondents have been flexible in order to continue and be involved with the questions closely during the conservation (Creswell, 2008). Collecting data have been continued to reach saturation, which means no new data would be gained to develop categories (Creswell, 2008; Strauss & Corbin, 2008).

The study has developed an interview protocol consisted of general questions in order to record data. The questions related to the people’s behaviors on the vernacular roofs are as follows: 1. Why were the roofs of the VRB built in this way? 2. How was the access to the roofs in the vernacular residential buildings? 3. What types of activities were done by residents on the roofs? 4. Did any factor affect the type of residents’ activities on the roofs? 5. Was there any space on the roofs in response to the residents’ behaviors? 6. Have the people’s behaviors on the vernacular roofs neglected in the recent years?

Table 1. Respondents’ codes.

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Profession</th>
<th>Code</th>
</tr>
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<tbody>
<tr>
<td>Mr. Abbasi</td>
<td>Master Builder</td>
<td>MB1</td>
</tr>
<tr>
<td>Mr. Asarfini</td>
<td>Master Builder</td>
<td>MB2</td>
</tr>
<tr>
<td>Mr. Asekhi</td>
<td>Master Builder</td>
<td>MB3</td>
</tr>
<tr>
<td>Mr. Helli</td>
<td>Master Builder</td>
<td>MB4</td>
</tr>
<tr>
<td>Mr. Salehi</td>
<td>Master Builder</td>
<td>MB5</td>
</tr>
<tr>
<td>Ir. Aminian</td>
<td>Expert</td>
<td>E1</td>
</tr>
<tr>
<td>Ir. Emamina</td>
<td>Expert</td>
<td>E2</td>
</tr>
<tr>
<td>Ir. Haeri</td>
<td>Expert</td>
<td>E3</td>
</tr>
<tr>
<td>Ir. Rayati Moghaddan</td>
<td>Expert</td>
<td>E4</td>
</tr>
</tbody>
</table>

**Data Analysis**

Analysis has been a process of meaning data. Data collection and analysis has been a simultaneous process in this method. Steps of the process have been repetitive, which means there has been a need to gain more information after data collection and during analysis (Creswell, 2008). In this study, collected data have been analyzed by transcribing and translating, reading them for several times, meaning, and interpreting them each time. It has been an inductive process, which have achieved general and broad codes from detailed data. Coding has been an act of drawing concepts out from data and developing them. Categories or themes have been generated through grouping concepts regarding to their properties (Strauss & Corbin, 2008). According to Creswell (2008), procedure has been validated through comparing it with existing
processes in the literature. The study has used computer for analyzing the qualitative data, which means process of saving, organizing, categorizing, coding, and searching has been facilitated by a qualitative computer program. However, it does not analyze the data. The selected program in this study has been NVivo10, with ability of coding, creating matrixes for comparisons and showing categories graphical.

FINDINGS

According to the analysis of responds and findings of interviews, the people’s behaviors on the roofs caused creating spatial, socio-cultural, spiritual, economic, recreational and passage, functions of the vernacular roofs. Several factors played a role in creating people’s behaviors on the roofs. They could motivate residents to move to the roofs, prevent doing some activities or vary the neighbors’ behaviors. Generally, climate, economy, religion and culture could affect people’s behaviors on the roofs in the VRB. Climate and culture caused spatial, sociocultural and recreational functions of the roofs. Religious convictions created spiritual functions of the roofs and the economy caused using the roofs as workplaces. As the findings show, the vernacular roofs were built in response to the people’s behaviors. The master builders flattened the roofs in response to this demand (Fig. 6). Moreover, the roofs of the adjacent VRB were separated by a partition wall with around two meters height, in order to provide privacy for residents during the activities on the roofs (Fig. 7). The related quote of E1 is as follows:

“When several households lived in a place, there was not sufficient space for sleeping and relaxation. For this reason, they used the roofs for sleeping and the master builder considered it during roof construction. Therefore, they flattened some parts of the roof. A partition wall around the roof was built for different purposes. Firstly, neighbor’s house was not visible from this roof, or this house was hidden from the others views when the residents of the adjacent house came on the roof”.

Figure 6. a. Double surfaces roof technique in the VRB, Akhbari house, Kashan, Iran, b. The perspective of the double surfaces roof technique (Source: Authors, 2012).
Furthermore, for access to the roofs, the staircases were built in the VRB, which all respondents confirmed it (Fig. 8). As MB2 stated, the master builders considered access to the roofs at the beginning of the construction. The design of the staircases varied in each house. Although, the roof staircases provided access due to the residents’ activities on the roofs and for carrying the materials to the upper levels during construction, the entry of strangers was prevented for security issues. According to E4 declaration, some of the VRB had several staircases, while MB4 stated that the inherited houses had shared staircases outside or between them. Except the inherited houses, all staircases were located inside the VRB at corners, in dead spaces, main rooms, open areas or public places. As MB4 mentioned, the least area was allocated for staircase space, thus, they were narrow. The staircases included numerous steps with high risers and narrow treads (MB1, MB3-MB5, E2 and E3). Generally, the people VRB had irrational and improper roof staircases with difficult access, whereas, the rich ones had proper and beautiful staircases (MB3, MB5 and E2). The following quote of E2 has indicated that the staircases in the VRB of rich people were more beautiful and proper:

“...They usually used staircase, which the rich one was regular and comfort and for the poor was irregular. Sometimes the stairs were high and narrow and access was difficult such as Bafandeh house and in some cases, they had beautiful staircases.”

The functions related to the people’s behaviors, including spatial, socio-cultural, spiritual, economic, recreational and passage functions gained through interviews, have been described in the following sections.
Figure 8. a. The roof staircase has been located inside the house in corner of a room,  
b. Curved roof above the staircase space called *Kharpseh*  
(Source: Author, 2012)
**Spatial Function**

The vernacular roofs acted as useful and open spaces for the residents' behaviors. In response to the culture of people, master builders flattened some parts of the roofs during the constructions to provide the possibility of people activities on them. The residents used the vernacular roofs as living spaces that have been described as follows:

**Roofs as living spaces**

Several factors were effective in using the roofs as living spaces by residents. The climatic conditions of Kashan and the hot temperature in the evenings (MB4, E1 and E2), motivated people to move to the roofs and used it as living spaces. Lack of spaces in the small and populous VRB (MB5 and E2), lack of new technologies such as lighting for nights, cooling and heating systems were other effective factors, which encouraged residents to use the roofs as living spaces (MB4 and E1). The effects of wealth on people's behaviors on the roofs can be detected by this function. According to (E1 and E2) declarations, the rich usually did not use the roofs for doing activities due to the below sufficient spaces and large courtyards.

The residents prepared the roofs for sitting and sleeping at the summer nights by sprinkling the roofs in the evenings to mitigate the temperature, carpeting them and erecting the mosquito nets (MB1-MB4 and E3). They gathered, sat, ate dinner on the roofs and talked to their families or neighbors at nights in the summers. They also held meetings and family parties on the roofs. According to the respondents, sleeping on the roofs, watching the stars and enjoying the cool breeze was an interesting tradition of people in Kashan (MB2-MB4, E1, E4). The quote from MB2 about the living activities of people on the vernacular roofs is as follows:

“In the past, roofs were used for sleeping at night, mosquito nets were erected between two domes..., and people slept in them and enjoyed the cool weather at night, the breeze and the stars... Several households lived in the old houses. In the evenings, they carpeted the roofs and sat, ..., ate their dinner, used the night breeze and slept there.”

The residents used *Kharposhteh* spaces as closets to keep the coverlets and beddings (MB4 and MB5). In addition to the partition walls between the neighbors for keeping the privacy of residents on the roofs (MB1, MB2, MB4, MB5, E1 and E2), the domes on the roofs acted as barriers between sleeping people on the roofs and kept their privacy (MB5). Moreover, as MB3 stated, the roofs were used as storages. Furthermore, the roofs in the VRB were used for sun drying purposes. People could dry their washed clothes, carpet, fruits, vegetables and products by using the direct sunlight on the roofs. Following quote from E1 has shown these activities:

“Roofs were places for hanging clothes and drying them and the residents tied rope over the roofs for hanging washed clothes... In the past, after washing vegetation, residents dried them on the roofs... Generally, they used the roofs for more sunlight utilization. The roofs were vast and captured daylight more than courtyards. Hence, they were used for drying different things such as skin of pomegranate and eggplant pickle.”

According to MB4 statement, some residents used the sunlight of winter at noon on the roofs during the physical activities, for heating and health benefits. Using the sunlight and cool weather of nights on the roofs was one of the energy efficient approaches in the VRB.
Sociocultural Function
The limited presence of women in the society (E1), close relationships between neighbors and members of families, were some factors that caused emerging various activities on the roofs. According to the culture, neighbors’ communication was the considerable behavior of people on the roofs in Kashan. Moreover, as E3 during the interviews stated, the roofs were good places for some private activities such as lovers’ dates. According to E1 statement, Persian-Room was a small space on the roofs that some residents built for some private meetings. The following behaviors indicate the friendly relationships between people in the past neighborhoods.

Roofs as neighbors’ interaction centers
The roofs in the VRB provided the possibility of neighbors’ communication (MB1, MB2, MB4 and E1-E2) and watching the neighborhood happenings (MB1-MB4 and E3). The neighbors met each other and spent their time on the roofs, especially in the summer evenings or at nights. Furthermore, the roofs were places for informing news to each other, when something was lost or found, and for political issues and chanting (MB2). Mainly, women, who had limited social activities, used the roofs more than men did. They gathered and watched the neighborhood happenings such as the wedding, ceremonies or funeral on the roofs and communicated with the neighbors (MB4, E1 and E2). The following quote from E1 indicates this behavior on the vernacular roofs:

“Generally, women had not any activity in the society and were not permitted to go outside the home or participate in some ceremonies. The roofs were the only places that women could use it for watching rituals, ceremonies, and wedding. They were free there. Hence, women had to go to the roofs for watching the city happenings.”

These activities changed the roofs to the interaction centers in the neighborhoods. Obviously, it shows the people’s friendships and their socializing tendency.

Economic Function
People did some economic activities on the roofs and used them as workplaces. The following quote from MB4 is about the economic activities on the roofs.

“... The people’s behaviors depended to the economical workshop activities in the houses. Therefore, they used the roofs for doing part of their work.”

These behaviors have been described in the following section.

Roofs as workplaces
Occupation of the residents was an effective factor for differing types of activities performed on the roofs. Some residents regarding to their occupation, used the vernacular roofs as workplaces, worked on the roofs, and prepared their products. Dyers, weavers, and farmers used the roofs for drying their products by using sunlight and prepared them for sale. Farmers dried their products on the roofs and produced dried fruits (MB3, E1, and E4). Dyers laid and dried the dyed yarns on the roofs (MB4, E1 and E2). Moreover, panegyrists used the roofs as pulpits for making speak and calling to prayer at dawns during the Ramadan months and earned money through the neighbors (E1). Furthermore, weavers, weaved, dried, and prepared their products on the roofs (MB3, MB4 and E3). Therefore, the roofs served the residents as workplaces.

Spiritual Function
The religious convictions of people in Kashan were an effective factor in emerging some spiritual behaviors on the roofs such as the call to prayer and worship. The roofs provided intangible and...
spiritual benefits for the residents. Some residents performed timely Azan on the roofs to inform the time of prayer to the neighbors due to the lack of the timepieces (MB2-MB4 and E1). Likewise, when a neighbor faced to a problem or a woman was in her hard labor time, they performed untimely Azan to inform the others to pray for him or her (MB1, MB2 and MB4). They also played timpani on the roof to request praying (MB4). Some residents called to prayer and invoked at dawns in Ramadan months on the roofs (MB4 and E1). Generally, women and older people used the roofs for listening or watching the ritual and religious ceremonies (MB2 and E1). Furthermore, the residents sent a panegyrist to the roof, when a group of people was going to the pilgrimage trip, in order to inform the neighbors. Then, people went to the roofs, gathered, listened, watched and wished a good trip for them (MB2). Therefore, the roofs in VRB were in response to the religious demands of the people in Kashan. These activities indicate that the neighbors were united and informed the religious traditions to each other. They intended to take advantage of spiritual activities collectively.

**Recreational Function**

In addition to the aforementioned activities, the roofs in the VRB offered open spaces for entertainment and children playing (MB4 and E3). However, MB4 mentioned that the vernacular roofs were rather dangerous for children due to the lack of safety and safeguards at the edge of the roofs. Hence, they could play during their parent assembly on the roofs and under their supervisions. The hobby of some people in Kashan was keeping and flying domestic pigeons (MB1-MB5 and E1-E4). Pigeon fanciers kept, bred and flew them on the roofs. Sometime, they held matches between pigeons on the roofs (MB4). They built a space on the roofs, called it *Ganjeh* to keep and bred their pigeons (MB1, MB2, MB4 and E1-E4). Moreover, they gathered there to fly them and enjoy their aerial performance. It was a joyful entertainment for them, although their activities bothered the neighbors due to their praying (MB4). Hence, the people of Kashan recognized the roofs as places for restoration and relaxation.

**Passage Function**

According to the statements of MB3 and MB4, the levels of the roofs in the VRB of Kashan were aligned, which means the roof of a house was as level as the adjacent roofs and were connected. In some cases, they were separated by a partition wall with up to nearly 2 meters height to keep the privacy of the residents and neighbors, and provide the comfort of occupants during their physical activities on the roofs (MB1, MB2, MB4, MB5 and E1-E3). The aligned roof concept was, according to the principles of Iranian vernacular architecture. It shows the culture of the same respect for all human beings and every household dignity, whether rich or poor (MB4). As the MB4 quote indicates, aligned roofs also provided privacy of residents.

“…all the roofs of the houses were built at the same level,… Indeed, the aligned roofs caused keeping the privacy and security of the house.”

Furthermore, this approach provided passing across the roofs (Fig. 9). The residents could walk on the roofs and reach to the other neighborhood (MB2, MB3, E1 and E4). However, MB3 stated that in some cases, it was difficult to pass across the rooftops due to the domes on the roofs or partition walls between the VRB. Passing across the roofs caused erosion of the final layer of roofs and necessitated maintenance and re-covering every 2-3 years (MB2, MB4 and E1).
Although the vernacular roofs were not costly (MB1-MB5 and E1-E4), the interviewees have confirmed that the vernacular roofing, and people’s behaviors on the roofs have been neglected in the contemporary residential buildings (CRB). The roofs have been changed thoroughly compared to the vernacular roofs. The principles of Iranian architecture have been disappeared in the new roofs (MB3). The roofs have become a place for keeping antenna, installation and chiller equipment and are used as storages (MB3, E1 and E3). The final layer of the roofing has been replaced with the cement or isolated layers, which both are improper materials and weak in hot temperature. Isolated layer is penetrable, absorbs heat during the day, and releases it at night, which increases ambience temperature (MB2, MB4 and E1). The partition walls between the neighbors have been disappeared, hence, the roofs do not provide privacy for the residents (E2). Subsequently, the people’s behaviors have been disappeared on the roofs (MB2-MB4 and E1), although, E2 and E4 stated that some residents in Kashan or in small cities still use the roofs in the evening and sleep on them.

**Interrelating Themes**

The obtained themes have been interrelated and generated a conceptual model, which have been shown as a visual model in figure 10. The functions of the vernacular roofs caused creating roofing strategies and consequently, benefited the residents. As the model has shown, climate, religion, culture, and economy affected the people’s behaviors on the roofs and caused creating spatial, sociocultural, economic, recreational, spiritual, and passage functions of the roofs. In response to these functions, particular roofing strategies emerged, including aligned and connected roof, flat and double surface roof, staircase, partition walls around the roof, spaces such as Kharposhteh, cage and small space on the roofs. Consequently, the vernacular roofs were in response to the people’s behaviors, improved physical and mental health, offered spiritual and intangible benefits.
Conclusion

The vernacular roofs in Iran served more than protective functions and were in response to the people’s behaviors. The case study has investigated the people’s behaviors on the roofs of the VRB through conducting semi-structured interviews with local master builders and experts. The results show that climate, economy, religion and culture affected people’s behaviors on the roofs in the VRB. The roofs’ functions regarding the people’s behaviors included spatial, socio-cultural, spiritual, economic, recreational and passage functions. The residents used the vernacular roofs as living spaces and did some physical activities. People used the sunlight on the roofs for drying purposes or heating and health benefits. Additionally, the vernacular roofs were used as workplaces by panegyrists, farmers or weavers. Some people, who were pigeon fanciers, used the roofs as recreational spaces. Furthermore, the vernacular roofs acted as passages for access to the other neighborhoods. The aforementioned functions demonstrate that the occupants knew the roofs as main spaces in the buildings and used them regarding their demands; likewise, the roofs provided security and privacy of the residents. The vernacular roofs were also neighbors’ interaction centers and worship spaces. The functions related to the people’s behaviors, indicate the friendly relationships and communication between the family members and neighbors. It shows that people had small integrated and healthy society in the neighborhoods. The vernacular roof functions that have been neglected recently can be adapted for the CRB according to the new lifestyle. Hence, the study recommends professionals consider people’s demands and behaviors during roofing in order to use all the potential of the roofs in the CRB. Choosing appropriate roofing materials, keeping the privacy and security of residents and considering climate, culture, religion, and economy of people would assist in improving the roofs functions in the CRB. Therefore, the further research is needed to investigate the new lifestyle, culture and demands of residents in order to provide the people’s behavioral responsive roofs.
REFERENCES


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