

## Functional Requirements of Neighborhood Self-Help Centers in Major Cities Case study: One district in Tehran

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### ABSTRACT

Iran is located in the Alps - Himalayan seismic belt, one of the most important seismic regions in the world. As a result, from 2002 until now, about 60 earthquakes with different magnitudes have been recorded by International institute of earthquake engineering and seismology. This confirms the fact that nowhere in Iran, is immune from the threat of earthquakes. In major cities which typically are important regarding political, economic, trade and cultural matters, and partly because of the large population and inadequate infrastructure system, after the earthquake human and financial losses have happened. The history of Earthquakes in Tehran, one of the most important cities in Iran, proves that there are several faults in and around. The emergency assistance from the vicinity were not practical and useful because of the disconnected main roads after the earthquake. So these are the most serious concerns that Tehran will be facing in future too. Due to these reasons the existing buildings in major cities are highly vulnerable. Retrofitting of action is. Not only it a big budget has to be specified to the matter, but also it needs lots of time too. Meanwhile, an earthquake may occur any moment. Therefore, we must now make decisions and plans about the awareness of the people at the time of, before and after earthquakes. This paper discusses the idea of creating a multi-purpose complexes with special architecture which is active before and after an earthquake with different activities based on the concept of self-help in emergency situations and a study about spaces required in these circumstances, structurally entitled "Neighborhood self-help centers". The case study is conducted in district 3 of Tehran. The research presented in this article has a practical goal and its analysis strategy in conclusion quality is based on the foundation's information theory and Imaging methods are done. Collecting data were from the study library. In the, results will be provided in a table. This study seeks to answer these questions; what functional requirements of the "Neighborhood self-help centers" in the time before and after the earthquake are there and how the principles of flexibility and adaptation can make this multipurpose complex dynamic before earthquakes and efficient after it? The main results show the performance of these centers are educational applications, research, service, entertainment and official matters before earthquakes and predictable and reliable alternatives with essential applications after earthquake such as therapy, temporary accommodation, service, entertainment and official activities.

**KEYWORDS:** Earthquake, Neighborhood Self-Help, Flexibility, Adaptation, Tehran.

### 1. INTRODUCTION

Iran is located in the Alps - Himalayan seismic belt, one of the most important seismic regions in the world. As a result, from 2002 until now, about 60 earthquakes with different magnitudes have been recorded by International institute of earthquake engineering and seismology. Earthquakes in recent years around the country, especially Bam, Ahar and Varzeghan earthquake, are the alarm for Tehran, where is in the region of the earthquake and has the historical background, is ready for such a disaster event. The metropolis of Tehran are awaiting for the devastating earthquake of 7 on the Richter scale. According to statistical studies of earthquakes that have been recorded previously in the Ray and Tehran, with the possibility of more than 70 percent on average every 158 years devastating earthquake occurred in this area and the last earthquake in Tehran happened in 1209, IE 185 years ago so Tehran earthquake 27 years late. The main factor of earthquake in Tehran is because of 15 faults in the area[1].The last large earthquake shows that a large percentage of victims have been survived by family members, neighbors or people in the neighborhood, but ordinary people often have a little bit knowledge of helping and surveying people so they are sometimes unintentionally causing serious physical harm. In addition to pulling victims from the rubble, it requires proper training, equipment and organization [2].In this regard, it is necessary to train and educate people to have the skills to help their local neighbor and help their neighbor in such disaster position. Now in some major cities in the world, structured as emergency response volunteer groups, formed and developed in the neighborhood.

This paper examines the idea of creating a multipurpose complex with special architecture which is active before and after an earthquake with different activities based on the concept of self-help in emergency situations and a study about spaces required in these circumstances, structurally entitled "Neighborhood self-help centers". The research presented in this article has a practical goal and its analysis strategy in conclusion quality is based on the foundation's information

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theory and Imaging methods are done. Collecting data were from the study library. In the, results will be provided in a table. This study seeks to answer these questions; what functional requirements of the "Neighborhood self-help centers" in the time before and after the earthquake are there and how the principles of flexibility and adaptation can make this multipurpose complex dynamic before earthquakes and efficient after it?

## 2. RESEARCH METHODOLOGY

The study is based on information collected from various sources and developed in a systematic form and due to topic and conditions that occur before and after the earthquake in the community, the study is based on qualitative research methods. Measures included descriptive (based on the patterns and themes, according to the executive and category), Inference based on qualitative data analysis, the grounded theory and performed by visualization and graph (compare the separate criteria, including the components, factors, according to the relationships between variables, finding metrics interview), explanation (Chain of documents and creates a sense of cohesion / comments), Sample groups (check the background of designing this kind of complex), calibrations (classification issues, the fundamentals of the complex before and after the earthquake) and finally the conclusion are based on data extracted. Research tools (data collection) in this research are based on the study of textbooks, reference libraries and harvesting referring to statistical data, with the preparation of questionnaires, interviews with staff competent in a crisis and earthquake research institute, review articles and dissertation.

### 3. Background and theoretical framework

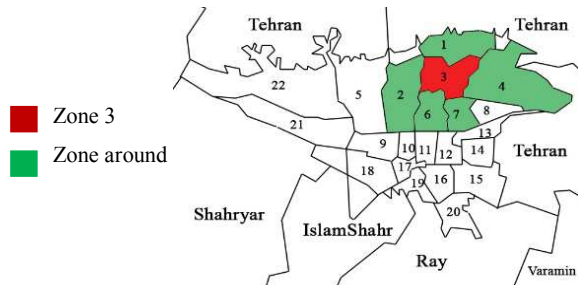
In the world, especially in seismic countries such as Japan, numerous activities were done like to include emergency management, retrofitting buildings, training citizens in the face of this situation and the main concern of their government has been about the earthquake. In this regard, a comprehensive crisis management program launched in 2001 based society to take steps in order to fulfill the resiliency of communities and find solutions, for example, in the village in Taiwan Sheng, based on the new program on society management, residents have learned society to how the vulnerability analysis can solve problems and find suitable solutions to achieve. Finally, an organization created to crisis management tasks through a participatory process to accomplish. In addition, the course was held in response to the disaster and a disaster scenario to increase their ability to respond to emergencies. Based on this case study, a phased process includes the creation, assessment, planning and implementation and training [3].

On the other hand, it is very important to find the reason of these situations and find the solution, so in this article we look earthquake is an emergency. It is now clear that most of the seismic countries have been located on the Seismicity belt bands. According to tectonics plate, Iran is pressed between the pages of Europe, Asia and Arabian plate. The best sign of this situation, Zagros and Alborz intersection that create a mountain. Most of Iran's major earthquakes occurred near the intersection [4]. A great percentage of Iran was formed of earthquake faults, so in the last two decades, more than 100,000 people died as a termination of the earthquake and more than this number be disabling, physical injury, and psychological disorders such as depression and chronic fear [1]. In order to the similarly dangerous faults in Tehran, to improve the construction and intellectual approach to the global minimum standards. That's why for a long time, national authorities have taken measures as the crisis management organization. The organization of his work in 1990 to develop an integrated management in policy, planning, coordination and coherence in the areas of research, information and monitoring focused on the different stages of crisis management and Development and reconstruction of affected areas and use of all facilities and equipment needed ministries, public institutions and optimized to take advantage of the capabilities of local and regional disaster in the face of natural disasters and unforeseen established that Most of the problems after the earthquake and other natural disasters deals. Every year for one week is named as protection against earthquakes, and on this week government held some maneuvers and conferences. Other cases include the volunteer emergency response community in Iran (Durability), International Cooperation Agency Project of Japan (JICA) and Prevention of Crisis Management in Tehran, the pattern of people's participation in health management program based health volunteers the plan to reduce risk and crisis management and capacity building workshops and capacity to deal with disaster risk at the local level [2], according to the danger of this event, these action are not enough and because of Lack of information, lots of people still died or damage in earthquake. For example, we can mention the earthquake in Bam, the size of the disaster caused by the earthquake due to the large distance of the surrounding towns, interruption of communications and the disappearance of the city administration was not entirely clear at first and unfortunately after 12 hours the first broadcast news were transmitted. During this time, people of the village were alone and just local people helped their self [2]. About this topic, one research was done that the name is "A study on Implementing Neighborhood Self-Help Planning for Sustainable Earthquake Disaster Reduction". The secondary objectives that this research mentioned are: Strengthen local communities against earthquakes, improve public awareness about disasters and how to deal with them, improve safety and security in the area and increase local decision-making power in the earthquake. The advantages and strengths points of the research are: Using the potential of the whole of society and people, low cost maintenance and equipping of the system, high speed aid to victims in order to the first aid groups are from the neighborhoods, develop a sense of solidarity and common understanding among local residents according to create feel of useful, joy and vitality atmosphere among people and creating a suitable platform and a very high potential for joint projects and other programs [5]. One of the important activities of this complex is after the earthquake which acts as a health center because transport system does not work properly after the earthquake or maybe way to hospitals blocked or medical centers cannot work properly or it may be full and cannot accept more patients. Therefore, it is important to set to work as a hospital so that the medical team can use it.

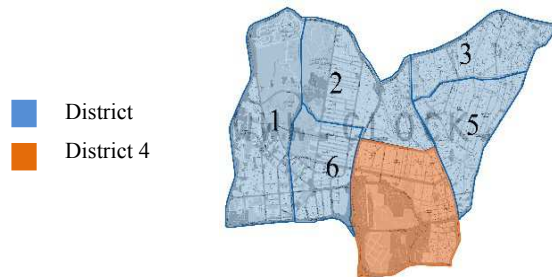
There are medical devices as well as the local rescue team helps to effectively save the lives of injured people in the neighborhood work[6].

#### 4. Case study: One district in Tehran

Case study of land located in Zone 3, as shown in Figure 1, it is clear. This area is located between the zones 1,2,4,6 and 7. The area is 31/208 square kilometer. As shown in Figure 2, it is clear that the region has six districts and 12 neighborhoods (GUI, Ararat, Amanollah Regime, Hassan Abad, Pharmacology, optional, second door, Davdyh, Seyed Khandan, cassock, Gholhak and courses and Kavsyh).



**Fig. 1.** Location of zone 3 proportion to Tehran



**Fig. 2.** Location of zone 3

According to Figure 3, the characteristics of the area can include

- From the North: Vahid Dastgerdi Street intersection to the intersection of Highway teacher law
- From the East: Highway intersection mission Shariati Street to the intersection of Highway teacher;
- The South Shariati Street intersection to the intersection of Highway Professor Vahid Dastgerdi;
- The West: Modarres highway intersection to intersection Vahid Dastgerdi mission;
- Area: 642 hectares - 81/21% of the region;
- Context of Region Office - Commercial - residential;
- The traffic division: Medium traffic;
- Green space: 116.

## 5. RESULTS AND DISCUSSION

This section discusses the findings of this study, which includes functional requirements and feasibility of adjacent activities.

### 5.1. Functional requirements

With a history of different earthquakes that have been recorded, the only way to remain safe from harm and devastation after the earthquake are retrofitting homes and most important centers of the city in the face of natural disasters. Architects and structural engineers using the principles and techniques can achieve Earthquake-Proof Buildings. In this regard, some activities have been done, but these activities are not enough due to inadequate implementation in some buildings. Create a safe place, with high resistance to earthquakes, in every neighborhood of Tehran, Training local residents, Identify experts neighborhood and create an area for parking, both in emergencies and in the ordinary days of design principles, With respect to matters relating to structures and materials, are vital. In the methodology, questionnaires were prepared, according to Figure 4, the population is 300 people, among the 150 women and 150 men have responded to it and with respect to Figure 5, as is clear the highest percentage of respondents in the age range 20-30 years and 30-40 years.

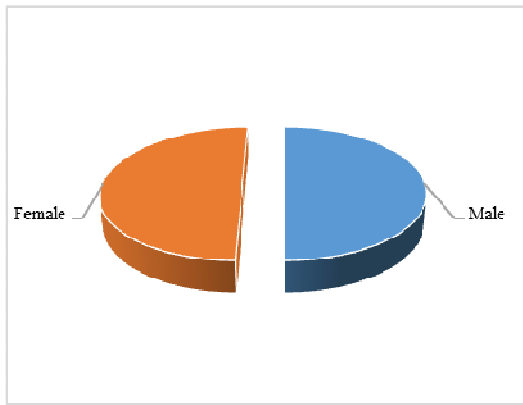


Fig. 2. Sex of the interviewee

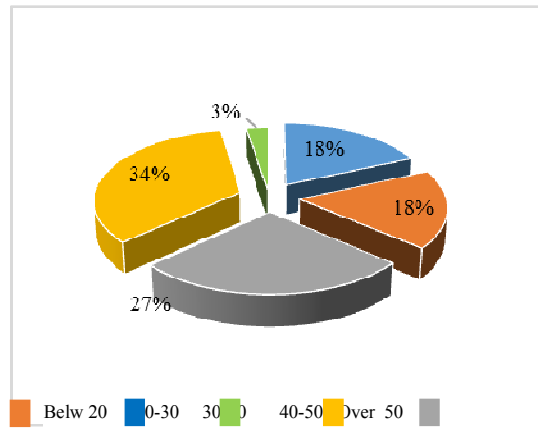


Fig. 2. Age of the interviewee

The questionnaire asked about the first level of knowledge that people have before dealing with the earthquakes and then asked people about the respective of organizations of the country about earthquakes and according to figure 6, 58 percent of people have moderate awareness, 16% have low awareness, 6% have very little knowledge about the activities before the earthquake and only 18 percent have high awareness. Checked this question showed that fewer people are aware of the necessary activities and because of the seriousness and unpredictability of this phenomenon, people need to raise their awareness by training and educating. One of the questions was about the level of preparedness in the face of an earthquake is caused, whether you are sure about your house structure and strength against earthquake? According to Figure 7, unfortunately 71% of the people were not sure about it. So with designing multi complex center with strength help these people.

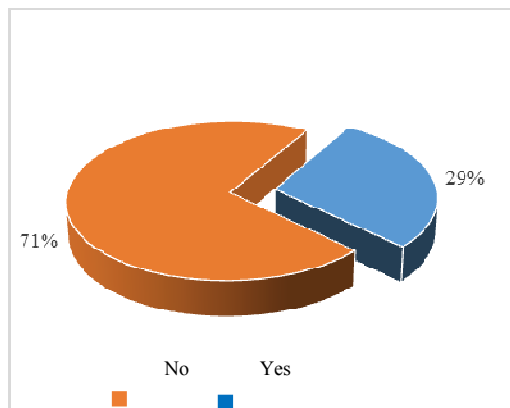


Fig. 3. Confidence of home structure

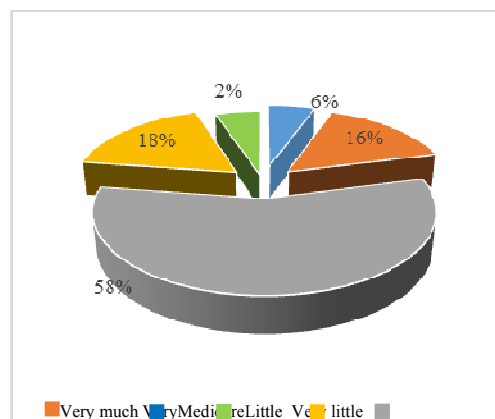


Fig. 4. The knowledge of the interviewee

Another question is about whether the activities taken by some organization such as municipal, fire station and emergency management organizations have been sufficient? According to Figure 5, the necessity of designing this collection is characterized that 36% said low and very low average know 32% lower and only 22% said that the activities are satisfied. According to Figure 8, it showed that the activities were not sufficiently so the questionnaire asked another question about building multi-purpose complex near their neighborhood, which the construction is safe in order to teach first aid and other activities related to earthquakes. Referring to Figure 9, it is clear that 49% of the people believed that making this multi-purpose complex is useful, 19% agree very much and only 12% believed that construction of this complex is less and less useful.

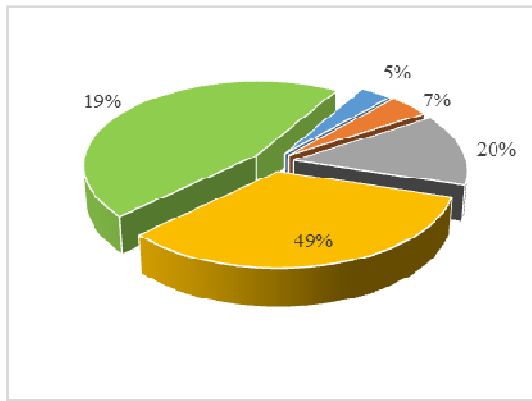


Fig. 5. Idea about the complex

Very much Medium Little Very little No idea

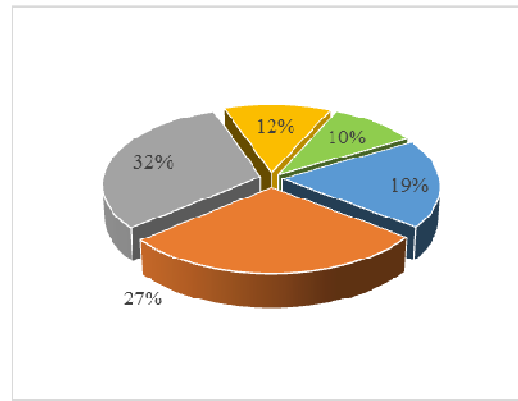


Fig. 6. Action of organization

Very much Medium Little Very little No idea

After discussing about the people’s knowledge and activities before the earthquake, need to discuss about building multi-purpose complex and its goal. According to figure, 6 main user and activities suggested for these complexes, and separately on each question, asked about the need of designing and manufacture each of the areas concerned. In Figures 10 and 11, the percentage of each activities are shown and the main activities are bakery, telecommunications, central kitchen and classroom have the highest percentage.

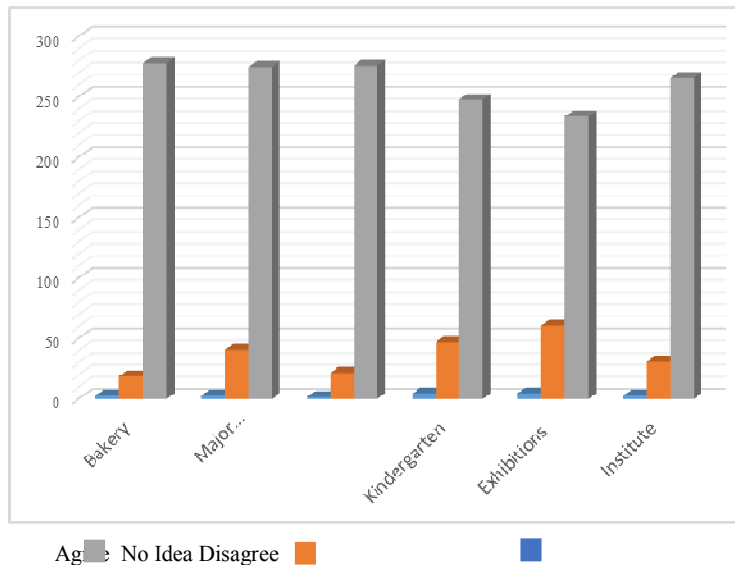


Fig. 7. Compare the activities

According to studies, a questionnaire on the subject and possible applications, reviews outlook design and factors related to its preset goals, the basic idea is designed according to the needs of the community and formed. Architectural design along with other physical and environmental factors in the social and cultural context of the site, given. The different needs of a seismic city prone, before and after the earthquake, require several activities. According to a description and need of multi-purpose complex the activities are grouped into broad categories, it provides the possibility of organizing architectural with the change of space, flexibility and versatility provided. In this category, according to case studies, questionnaire and survey design context requirements are achieved. With multi-functional studies in the center of the neighborhood, activities can be divided into the following categories:

Educational, research, service, administrative and social activities are for before the earthquake and healthcare, service, administrative activities and temporary accommodation are for after the earthquake. After determining the categories of activities in multi-purpose complex and according to studies and surveys, divided these activities to 3 groups, slightly open, semi-open and closed area as figure 12 showed.

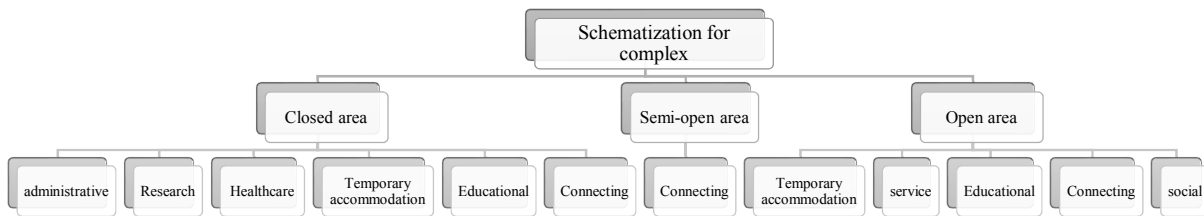


Fig. 1. Schematization for complex

The neighborhood self-help center is new so the activities and spaces provided for this complex are determined according to the needs of society and the conclusions of the questionnaire so before any action it is necessary to discuss about the main activities and related areas and then in the form of a table which consists of two main column, user activity before and after the earthquake is shown.

**Institute:** The main activity of this complex is teaching residents about earthquakes, as specified in Table 1, these activities are included areas such as management room, meeting room, secretary room, accounting rooms, administrative rooms, classes, coffee shops and places relevant facilities before the earthquake. People in the neighborhood will benefit from training classes, though classes can be used as public, but in terms of its design, should be adjacent in quieter areas and access to this space should be indirectly with the flexibility that this is set in the after the earthquake in areas such as the emergency management room, Closed temporary accommodation becomes steam and some users at the same time before and after an earthquake.

Schematization for before and after earthquake Table 1. Institute

Institute				
Space's name				
	Activity	Before Earthquake	Activity	After Earthquake
1		Lobby		Lobby
2		Management room		Emergency Management room
3		Conference room		Conference room
4		Secretary room		Closed temporary accommodation
5		Accounting room		Closed temporary accommodation
6		Archives room		Store
7		Teacher's room		Closed temporary accommodation
8		Office room		Closed temporary accommodation
9		Classrooms		Closed temporary accommodation
10		Guard room		Guard room
11		Pantry		Kitchen
12		Coffee shop		Coffee shop
13		Prayer room		Prayer room
14		Men's toilet		Men's toilet
15		Women's toilet		Women's toilet

- Educational activities
- Service activities
- Connecting activities
- Healthcare activities
- Research activities
- Administrative activities
- Social activities
- Temporary accommodation

**Exhibitions:** This complex requires monthly and annual fairs in conjunction with new achievements in earthquake, retrofitting industry as well as knowledge concerning the response to the earthquake. Part of this space could be used in place of access and movement so that everyone can visit it. In Table 2, scheme of the exhibition has been determined for before and after the earthquake. In the after earthquake most of the space, can turn to place as temporary accommodation and other part of the safe delivery room (at the time after the earthquake some part of area is intended to deliver valuable tools).

Table 2. Exhibitions Schematization for before and after earthquake

Exhibitions				
Space's name				
	Activity	Before Earthquake	Activity	After Earthquake
1		Lobby		Lobby
2		Galleries		Store
3		Atelier		Temporary accommodation
4		Secretary room		Temporary accommodation
5		The delivery room		Room safe delivery
6		Store		Store
7		Archive room		Store
8		Men's toilet		Men's toilet
9		Women's toilet		Women's toilet

**Research center:** One of the activities that has already highly efficient before earthquake is research activities which includes areas for study, research sites and library. This center examines data related to the earthquake and study in this regard, which includes areas such as management room, library, computer laboratories, research site, theater and the Facilities room. Communication and access to this center should be indirectly to create a quiet environment for studying, also lighting of this part is important so it need indirect lighting to avoid disturbance. In Table 3, small spaces and research center have been identified as part of the post-earthquake medical field becomes a collection after the earthquake it changes to the healthcare center because it needs silence too. Communication spaces must be defined in a way to gain access to these spaces so easily, with a space before the arrival can prevent sound.

**Table 3.** Research center schematization for before and after earthquake

Research center				
Space's name				
	Activity	Before Earthquake	Activity	After Earthquake
1		Lobby		Lobby
2		Management room		Therapeutic room
3		Computer laboratories		Healthcare
4		Research site		Healthcare
5		Library		Healthcare
6		Theater		Healthcare
7		Facilities room		Facilities room
8		Store		Store
9		Prayer room		Prayer room
10		Men's toilet		Men's toilet
11		Women's toilet		Women's toilet

**Kindergarten:** Children are more vulnerable among earthquake disaster. They do not have realization about things and events and to reduce environmental damage it is better to know the place that they have to go and live after the earthquake. This part contains spaces management room, teacher's room, classroom, workshop room, games room, children's lounge, dining room, kitchen and other spaces. The time after the earthquake, this part provide to service to children and mothers who have lost their family, so this part change their activities to Healthcare center for children.

**Table 4.** Kindergarten schematization for before and after earthquake

Kindergarten				
Space's name				
	Activity	Before Earthquake	Activity	After Earthquake
1		Lobby		Lobby
2		Guard room		Guard room
3		Management room		Emergency Management room
4		Secretary room		Healthcare
5		Accounting room		Healthcare
6		Archives room		Store
7		Teacher's room		Healthcare
8		Classrooms		Closed temporary accommodation
9		Teamwork Room		Closed temporary accommodation
10		Children's play room		Children's play room
11		Children's sport room		Children's sport room
12		Game room		Closed temporary accommodation
13		Dining room		Closed temporary accommodation
14		Kitchen		Kitchen
15		Pantry		First aid's room
16		Children's toilet		Children's toilet
17		Teacher's toilet		Teacher's toilet

**Major Store:** One of the most important parts of the complex is storage and service activities that are active before and after Earthquakes. Lack of facilities happened after the earthquake and make emergency situation. If before the earthquake government have a plan for the time after the earthquake and think about facilities that people need, the anxiety will be reduced. As shown in Table 5, it is clear, this part includes a lobby, entrance, first aid facilities, temporary living facilities, hygiene and sanitation, non-perishable food, tents, accounting room and guard room. After the earthquake, it changes in store and some closed temporary accommodation.

**Table 5.** Major Store schematization for before and after earthquake

Major Store				
Space's name				
	Activity	Before Earthquake	Activity	After Earthquake
1		Lobby		Closed temporary accommodation
2		First aid facilities		Store
3		Temporary living facilities		Store
4		Hygiene facilities		Closed temporary accommodation
5		Non-perishable food		Closed temporary accommodation
6		Tents		Closed temporary accommodation
7		Accounting room		Closed temporary accommodation
8		Guard room		Guard room

**Telecommunications:** Another important part of the complex is a telecommunications because after the earthquake, telecommunications of the city may be damaged and do not work well and at that time, transmit and receive information and news are one of the requirements. In this regard, this complex should have a separate telecommunications center. According to Table 6, this part includes management room, secretary room, computer room, computer services and Special equipment room. After the earthquake, it changes activities in the emergency management room, local radio room and telephone cabins.

**Table 6.** Telecommunications schematization for before and after earthquake

Telecommunications				
Space's name				
	Activity	Before Earthquake	Activity	After Earthquake
1		Lobby		Lobby
2		Management room		Emergency Management room
3		Secretary room		Facilities room
4		Computer service's room		Local radio room
5		Computer laboratories		Telephone cabins hall
6		Special equipment room		Special equipment room

**Major Kitchen:** After the earthquake nutritional needs are very important because according to the damage left, part of the supply is gone and if there is food, there is not a place for cooking. This part at the time before the earthquake works as a restaurant and after the earthquake works as a central kitchen to supply food. In Table 7 shows that major kitchen including the restaurant, kitchen, cold storage, food storage, Staff's changing room and Facilities room.

**Table 7.** Major Kitchen schematization for before and after earthquake

Major Kitchen				
Space's name				
	Activity	Before Earthquake	Activity	After Earthquake
1		Lobby		Lobby
2		Restaurant		Dining room
3		Kitchen		Kitchen
4		Cold storage		Cold storage
5		Granary		Granary
6		Dish's storage		Dish's storage
8		Staff's changing room		Staff's changing room
9		Facilities room		Facilities room
10		Men's toilet		Men's toilet
11		Women's toilet		Women's toilet

**Bakery:** Bread is the first nutrition for humans, especially in the time after the earthquake, so there is a bakery in this complex that according to Table 8, include bakery store, generator room, fuel storage room and staff room and Staff's changing room.

**Table 8.** Bakery schematization for before and after earthquake

Bakery				
Space's name				
	Activity	Before Earthquake	Activity	After Earthquake
1		Bakery		Bakery
2		Store		Store
3		Generator room		Generator room
4		Fuel storage room		Fuel storage room
5		Staff's changing room		Staff's changing room

**Hygienic-Services:** These spaces include a bathroom, shower, clean room, locker rooms and parking lot that each part of the complex included toilets. After the earthquake, it changes to bathrooms, Cleanliness's room and Toilet.

**Table 9.** Hygienic- Services schematization for before and after earthquake

Hygienic-Services				
Space's name				
	Activity	Before Earthquake	Activity	After Earthquake
1		Toilet		Toilet
2		Bathroom		Bathroom
3		Cleanliness's room		Cleanliness's room
4		Changing room		Changing room
5		Parking		Parking



**Entertaining part:** This part is located open area can be green areas, coffee shop and Community’s room and after the earthquake it change to open temporary accommodation.

**Table 10.**Entertaining part schematization for before and after earthquake

Entertaining part				
Space's name				
	Activity	Before Earthquake	Activity	After Earthquake
1		Green areas		Opened temporary accommodation
2		Coffee shop		Coffee shop
3		Community's room		Opened temporary accommodation
4		Roof garden		Roof garden

**5. CONCLUSION**

Recent studies suggest that Systematic model available at Neighborhood self-help centers that has the ability to perform functions related to education and research on earthquake aid in the time before the earthquake. At the time before the earthquake, the center should have the ability to perform functions related to emergency management, treatment and temporary accommodation, thus can raise the level of preparedness in each of the neighborhoods in Tehran before the earthquake and to provide medical services at the time after the earthquake, neighbors help people around themselves in a correct way, and providing temporary accommodation for residents who have lost their homes. All this will happen in a correct way, if the government had a management in an emergency situation.

Studies show that activities related to adaptability necessary before the earthquake activity after the earthquake there. According to different functions generally this complex has 7 activities that 3 of them are administrative, service and communication activities which have same acidities before and after earthquake, 2 activities (Educational and research activities) will change to temporary accommodation and healthcare activity. Achieve functional changes before and after the earthquake by applying the principles of flexibility is possible.

This paper is a preliminary study, with explanations about the functional requirement of a Neighborhood self-help center in one major city of Iran, like Tehran. That due to solve the problems that will occur in the time after the earthquake in Tehran that it should be plan for this time. In this regard, it is important to have a research about the structure and materials for these complexes.

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