TO STUDY THE EFFECT OF CRISIS MANAGEMENT IN REDUCING THE DAMAGES CAUSED BY EARTHQUAKE IN URBAN DECAY; (CASE STUDY: CHAHBAHAR TOWN)

Farid Ghasemi[1], Esmail Rahmani[1], Qumars Naimi[2], Mostafa Dalir[1]
[1]*Department of Urban Planning, Sistan Balochestan University, Zahedan, Iran*
[2]*Department of Urban Planning, tabriz University, Tabriz, Iran*

Abstract
One of the issues that most of the cities of the world are facing with, is natural disasters including earthquake that from time to time endangers the lives and property of a group of them and considering the unpredictability nature of them and the necessity of making a quick and correct decisions and implementation of the operations and the theoretical and fundamental principles of it, a field of knowledge as crisis management has been created. This knowledge refers to a set of actions which are performed before, during and after the emergency for reducing the effects of these disasters and reducing their vulnerability. Considering the historical seismicity status of Chahbahar town and according to the latest seismic hazard zonation map, the city is located in the area of seismic risk and also due to the existence of urban decay of this city, dealing with crisis management seem to be necessary. The present paper has been conducted with the use of descriptive-analytical method and the collection method is documental and bibliographical. With the use of Geographic Information System (GIS) the Earthquake-prone areas, Fault Lines have been identified and the urban decay area in the city has been specified. Also in this study the issues and problems related to crisis management and the required actions have been studied and our aim is to put an emphasis on crisis management and the necessity of the role of urban planners in reducing the vulnerability of the city against earthquake disasters and taking correct executive, remedial and managerial actions for the improvement and reconstruction of the urban decay of the city as well and studying and extending the standard construction throughout the city.
Key words: Crisis management, Geographic Information System (GIS), old textures, Chahbahar

Introduction

In the recent century one of the issues that most of the countries and cities of the third words are struggling with is the issue of natural disasters that considering their unpredictable nature and need for quick decisions and executions of operations and planning a field of knowledge named crisis management have been emerged which today attracts a fundamental attention in the field of urban management to it.

Since Iran is located on the Earthquake-prone belt in the Alpine – Himalayan, it is considered as one of the young and orogenic parts (UNISDR, 2005: 4) and is one of the Earthquake-prone countries of the world (Mohammadi Ahmadian et al., 2010: 2). From every 153 Destructive earthquakes which occur in the worlds, 17.6% of them is related to Iran (Ahadi Nejad et al., 2006: 2). Earthquake has been existed as a Repeatable phenomenon throughout the history and continues to be in the future as well. Earthquakes in most of the cases have destructive effects on human settlements and their residents. Although in past decades with the advances in human knowledge scientists discovered how this phenomenon emerges; however, still they are not able to prevent it from happening and in so many cases they don't even have the required knowledge to make accurate and scientific prediction regarding the time and magnitude of this event (Shia, 2010: 2).

Cities as a place of human population gathering are not exception from this natural disasters (Ghanavati et al., 2009: 17), in which the way of design and the used material in buildings and Constructions are also influential in the rate of damages and fatalities (Omidvar, 2011: 18 & 19). In the design and execution of buildings, the most important issue is to protect the lives of people which have the first importance (Movahedi et al., 2012: 3). Therefore, easily we can understand that studying the ability of a city in dealing with natural disasters and a proper planning for preventing or reducing its destructive effects have a special importance (Smith: 2003). Considering this it is so much necessary to point out that we cannot prevent an earthquake to happen; however, we can reduce its damages and fatalities. Elimination of disaster is impossible; however, reducing the damages caused by it is possible (Lewis, 1981: p 33). One of the most important factors in reducing the danger of earthquake is prior preparation of the society in dealing the phenomenon of earthquake. This preparation for dealing with the phenomenon refers to having a pre-planned and specified plan (w Kates, 1977: p 271). Today, experts from different fields are facing with the cities vulnerability and specially the old and worn-out texture of cities against earthquake as a global issue. This situation in countries with a more risky natural structure, including Iran, has been manifested itself in a more sever way during the past recent years (Monzavi, Mashhid 2010: 2). In Iran and during recent years, especially after the occurrence of earthquakes in Roodbar and Bam, significant activities have been undertaken in different aspects of emergency manamgnet, earthquake and reduction of its damages. In spite of this, in urban plans, lack of serious attention to the issue of crisis management and cities vulnerability to earthquake appears to be a clear issue (Azizi, 2008: 25), and the necessity of dealing with crisis management should be considered as a inevitable issue. crisis management refers to a set of actions which are undertaken prior, during and after the occurrence of the disaster for reducing the effects of the disaster. One of the areas that are damaged in case of the occurrence of any kind of disaster, especially earthquakes is urban areas and this clearly indicates to the necessity of implementation of the emergency program. The mistake which easily happens in crisis management is that it is assumed that for all the emergency one solution exists, while since different crises are resulted from various instances and different factors are influential in their occurrence; therefore, for controlling and managing them different plans ad programs should be implemented (Ten Berge 1994: 24).

It should be accepted that always a percentage of crises are inevitable and in face a part of them are integral and natural to the life of system; however, a great part of threats, emergency are impost and should be predicted and prevented with studies, wisdom and correct management

before occurrence. Therefore, with regards to the future, new positions should be taken, accurate and correct visions should be imagined and predicted so that managers of the society will not be taken off-guard and will sank in the whirlpool of changes. In line with achieving these goals identifying the vulnerable textures is among of the most important solutions and city of Chahbahar is not an exception from this and the present study will study the effect of crisis management in reducing the damages resulting from earthquake in urban decay of Chahbahar city, the urban decay which is so much old and in a way forms the identity of the city and its citizens, and no attention has been given to Retrofitting it and day by day it is going more and more toward more deterioration. This part of the city, that in physical terms is the most vulnerable part of the city, in case of the occurrence of any disaster can have so many fatalities and financial damages and due to this dealing with crisis management for reducing the damages resulting from earthquakes in the urban decay of Chahbahar can make the necessary action for preventing this matter easier.

Chahbahar city due to its geographical location and being located on active faults and also due to Oman oceanic crust sinking beneath the Makran, like other cities of Iran is not an exception from the dangers and threats of earthquakes and on the other hand, the existence of urban decay which are generally consisted of one story of two–story houses with little infrastructures that are built beside on another in a compressed manner and are not constructed according to technical standards and don't have the necessary stability against earthquakes which Exacerbate the risk and damages of earthquakes. The main aim of the present article is to study the effect of crisis management in reducing damages resulting from earthquake in urban decay of Chahbahar and providing solutions for reducing damages resulting from it with the use of GIS.

Research background

During the past years, in this field multiple studies have been conducted with the use of different methods including which we can mention the following studies:

- Sule Tudes (2010) in a study with the use of GIS and AHP technique and with the use of different criteria including application type, slope, earth quality, height and … for Adana city which is one of the city's most prone to earthquake in Turkey, have prepared a Relative earthquake hazard map and have then used it for locating some of the urban applications.
- Jifu Liue (2001) in a study have studied the destructive earthquake of 7.1 magnitude of 2010 in Yushu in China which left 2698 dead and in their study in addition to presenting the influential factors for intensification of the caused damages to the region have dealt with the experiences of reconstruction and restoring of the region to its previous condition before the earthquake and have studied the role of public organizations in providing aids to the victims and resettlement of them. This study has considered the Specific environmental circumstances of the region and the lack of infrastructural facilities for aiding among the influential factors in the intensity of the rate of fatalities.
- Shams, Majid et al. (2011) in their paper with the title of studying earthquake crisis management in urban decay and parts of Kermanshah city, Case study: Feizabad neighborhood with the use of indicators such as material types, age of buildings, number of stories and … and the findings indicate that totally 70.61% of the Feizabad neighborhood is vulnerable according to the current existing indicators and standards.

- Movahedi, Ali et al, (2012), in a study with the title of studying the vulnerability of urban buildings against earthquake with the use of inversion hierarchical weight process (IHWP) in Geographical Information System: case study of Masjed Soleiman city with the use of Geographical Information System (GIS) have integrated the data and which finally results in the identification of the vulnerable neighborhood of this city against earthquake. The results indicate that 76.06% of the buildings of this city are vulnerable against earthquake. According to this the neighborhoods of Sabzabad have the highest vulnerability and the Talkhab neighborhood in spite of large area has a low vulnerability.

Theoretical background

The idea behind the formation of crisis management the first time was introduced by Robert Mac Famar when there was a chance of Missile engagement between America and Cuba and in this way from late 1970s crisis management in its today's form was started to be used. In Iran in spite of the fact that the first action was initiated in 1969; however, officially from 2004 the Department of Prevention and Crisis management for natural and unpredicted disasters was formed (Hossein Abbassi, 2009: 1).

In studying crisis management we are facing two totally different views:

A) Traditional perspective:

In this view, crisis management only deals with the issue of aiding and rescuing from case point of view and that only after the occurrence of the disaster.

B) Modern perspective:

In the new view or perspective with making use and taking advantage of all the scientific theories and technical advances especially achievements of management and new styles of Scheming and organizing, planning, Guidance and support, the issue of the surprise element and lack of preparedness in critical situations are dealing with and prior to the occurrence of any emergency we can face it with full readiness and preparedness. In this view or perspective, the aiding only consists one of the parts of the different stages of the cycle of crisis management and instead of waiting it prepares itself for preventing and effectively dealing with the emergency (Introduction to Crisis management , 2006: 14)

Crisis management theories

With regards to crisis management we can refer to two main theories:

1) Behavioral school theory

Behavioral view emphasizes on creation and Intensification of disasters as a result of unprincipled behaviors of humans. This trend has emphasized on the active role of technology and the power of science in preventing disaster; however, due to the fact that this view emphasizes more on the role of the decision makers and victim's and deals with the more extensive social areas and economic power has been criticized.

2) Structural perspective

Structural view (1970) has been introduced through the relationship between disasters and lack of development and economic dependency of the third world. In this view this belief exists that the increase in the disasters of developing and less developed countries is due to the attention of people to global economic matter, Expansion of capitalism and marginalization of poor rather than the effect of geophysical events. As a result the followers of this view for achieving a more

clear recognition and more clarification of the subject prefer to discuss about the nature of the natural disasters – what they considers them as the result of geophysical matter – and social, economic, political advances of less developed countries (Givechi, 2009: 38).

The concept of emergency

Emergency is a phenomenon that as a result of human or nature efforts in a short period of time will transform humans lives and in case that the local and central authorities will not have the required managerial techniques for dealing with this abrupt phenomenon it can cause fatalities, injuries, financial damages and etc. Emergency will reduce the health and the life level of people. The most human efforts for dealing with emergency is preplanning prior to emergency and application of it at the time of emergency and after it which reduces the problems caused by it (Vatani Oskouee, 2008: 9).

The concept of crisis management

It is a process for preventing emergency or to minimizing its effect at the time of its occurrence, for conducting this process the worst scenarios should be planned and then solutions to these scenarios should be sought. According to Claire Pearson theory crisis management refers to an organized effort by the members of an organization together with the stakeholders' outsider the organizations for preventing crises or the management of its efficiency at the time of occurrence (Taghwaee and Karimi, 2011: 28). Or in more comprehensive words we can say that crisis management just like the concept of emergency has been defined from different perspectives. The broadness of the concept-definition of this term is so much extensive and comprehensive that includes any kind of action taken for avoidance of crisis, Speculative search of emergency and Termination and inhibition of emergency with the aim of providing national and meta-national interests. Scientific – applied crisis management with the use of systematic observation of previous crises and their analyses seeks to find in instrument to prevent the occurrence of disasters or to prepare to deal with them and on the other hand, in case of their occurrence can aid and improve the situation. Some consider crisis management a kind of Strategic policy in the process of which achieving strategic path is established and some other strategies are created which helps the elites in achieving their determined goals and appropriate devised plans of the emergency and considering the concept and definition of the emergency it is obvious that crisis management include a set of operations and dynamic actions including planning, organizing, leading and controlling. In fact, crisis management is the process of reducing the risk of the occurred disaster or even with the use of Anti-emergency resources in an efficient way. In the definition of the role and responsibility of the crisis management two concepts have a so much effective role which are: Comprehensive Crisis management and Integrated Crisis management System (IEMS) which refer to a comprehensive event for performance measures and required programs in case of occurrence of any emergency situation. In this system all the elements and components have a double connection with each other. IEMS is a network which manifests the connection between the components of the CEM system both strategically and practically. In other words, CEM creates a mental concept out of crisis management and IEMS is a method for expressing the concepts and details of CEM required in IEMS; however, it is necessary that all the possible risks and damages of the occurrence of unexpected disasters and events in a society would be completely and totally evaluated and analyzed and the potential ability and the equipment and the required forces for reducing the effect of these disasters and events, readiness and preparedness against the disaster, fighting with the created emergency and the compensation

of its damage would be estimated, then with establishment of a series of actions and a series of predefined stages, the gaps between the required facilities and actions in all the unexpected disasters and events in the crisis management system should be studied, evaluated and solved (Shahid Beheshti University, 1990).

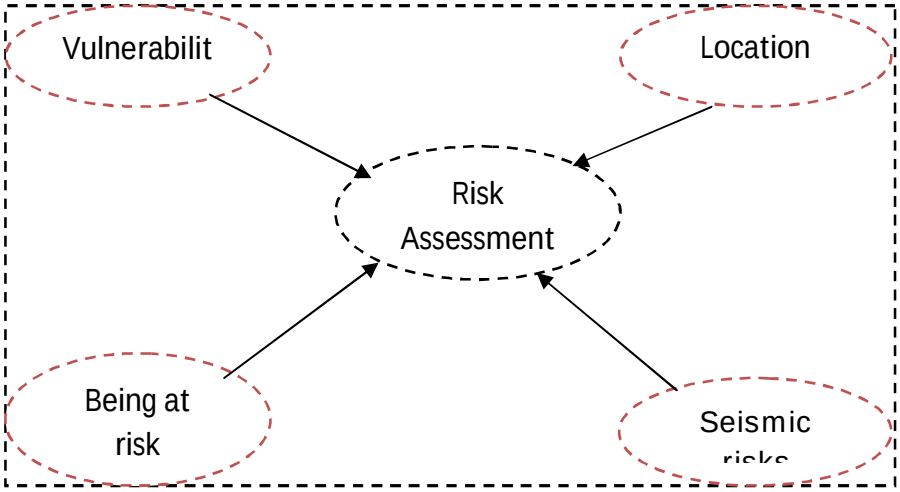
Urban vulnerability

It refers to the Capacity differences of urban societies for dealing with the effects of natural risks according to the locations in the material world (Urban spatial structure) and the social characteristics of its societies (The social structure of the city) (Ahad Nejad Roshit, 2010: 76).

Earthquake and vulnerability of urban decay

Earthquake refers to the abrupt release of excess energy at the beneath of the earth's crust that in case of occurrence of turbulence in a very short period of time can be released. Earthquake which is among the most common natural disasters results in so many financial damages and fatalities. In this regards, for reducing the effects of earthquake, evaluation is one of the solutions that can be helpful. Evaluation of vulnerability (urban decay) of the existing buildings is in fact a kind of prediction of their damage against possible earthquakes. Seismic Risk Assessment is related to for elements of seismic risks, being at the risk, location and vulnerability.

Figure 1- Seismic Risk Assessment



- Seismic risk: Seismic risk can be divided into primary and secondary risks. Primary risk is the breakage of fault or earth vibrations and the secondary risks such as flood resulting from breaking of a dam and fire resulting from the failures of gas lines.
- Being at risk: this element includes the resistance rate of buildings and structures, Population density of the area and … .
- Location: specifies the level of being at risk relative to the origin and type of risk.
- Vulnerability: defines in terms of the rate of the inflicted damages to one element at risk or to a set of elements resulted from one earthquake with a certain magnitude (Sasanpour and Mosavand, 2010: 76). City texture as one of the most important elements of the urban structures plays an important role in front of damages resulting from earthquake, in such a way that

Regular and discontinuous textures have a higher safety degree comparing to irregular and continuous textures (Pourmohammadi and Mosibatzadeh, 2010: 32).

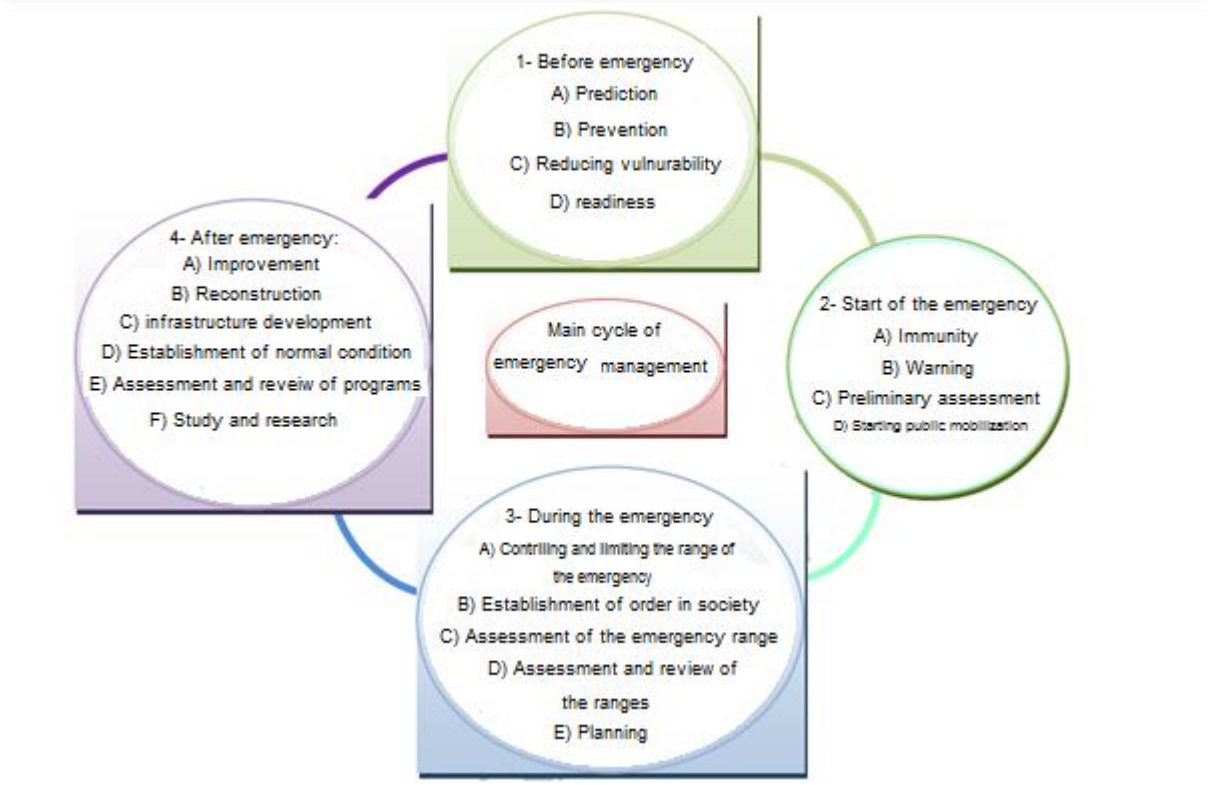
Crisis management in urban decay

Crisis management refers to a set of actions which are taken prior, during and after the occurrence of a disaster for reducing the effects and side effects of it as much as possible. One of the areas that will be damaged as the result of the occurrence of disasters especially earthquakes are urban decay that this indicate to the necessity of implementing emergency programs. the mistake that easily and simply occurs in crisis management is that it is imagined that for all emergencies a similar solution exists, while emergences are resulted from various instance and different factors are influential in their occurrence; therefore, for controlling them different plans and programs should be executed (Tan Bargi, 1998: 24).

If we will consider crisis management in a broader concept rather than the operation after the occurrence of the disaster, it will include reducing risks, special preparedness on a permanent basis and special needs and without considering vulnerability it will have a broader relation and connection with urban planning and designing and geography.

The range of the damages that a disaster causes depends on so many factors including urban infrastructures. In so many developing countries which are specified with severe concentration of population in villages and slum-dwellers a natural disaster can result in a Catastrophe (Abdollahi, 2008: 60). Studying and assessing the rate of damages resulting from earthquakes in cities indicate to the fact that the inflicted damages on them directly and indirectly are related to their inappropriate and improper urban planning and designing. Therefore, the physical dimensions of a city should be considered as having the most tangible roles in urban planning for reducing the effects of an earthquake.

Graph 2 – Crisis management cycle and the importance the urban planning assessment in it



Source: Teimouri 2004: 22

Urban planning role in reducing vulnerability of urban decay

One of the most important factors in reducing the damages of earthquake is prior readiness and preparedness of a society with dealing with earthquake phenomenon. The preparedness and readiness for dealing with an earthquake has different aspect. However, in our country so far only one of these aspects has been considered and that is Retrofitting against earthquake. Reducing vulnerability of the city against earthquake only through constructional measurements is not possible due to multiple reasons and will be only be realized when the safety of the city against the earthquake risks as a fundamental goals at all the levels of physical planning (from architectural to Land use planning) will be considered. Among other physical planning levels, middle level i.e., urbanism is the most efficient level of planning for reducing urban vulnerability against earthquakes. Here with the use of planning measurement we can plan and design cities in a way that at the time of occurrence of earthquakes the least levels of damages will be inflicted on them. The following diagram shows the role of urban designing and planning management role in crisis management. This role manifests in two topics of residents safety and creating speed and facilitation of crisis management measurements and actions. The direction of realization in both the topics plays an important role in the conditions of urban applications and physical characteristics of the city. Urban planning and designing should Layout and design the urban land uses in such a way that these uses will first serve as a safe residence against earthquake and second facilitate the necessary requirements for a better implementation of crisis management , because the damaging effect cause as the result of earthquake usually include physical damages, Functional differences and fatalities and it is required to make required

planning for reducing these risks and creating the necessary preparedness among public for dealing and facing with these kinds of disasters (Safari et al., 2005: 4, 5).

The area under study

Chahbahar city with an area of 13162 Km^2 is located at the Far East south end of Iran beside Warm waters of the Gulf of Oman and the Indian Ocean. This city includes three parts which Chahbahar town is locate at the west south far end of its central part and from Geographical location point of view, this town is located at $25° 17' N\ 60° 37' E$. This city meets Chah Bahar gulf in west and from south meets Oman gulf in such as way that has a coastal line of 18.5 km with Oman and Persian Gulf. In this way the possibility of accessing international waters through Chah Bahar port have provided a special position for it. The area of Chahbahar town is 2300 Hectare. Based on Population and Housing Census in 2011 Chahbahar town has a population of 85633 and has 19313 households.

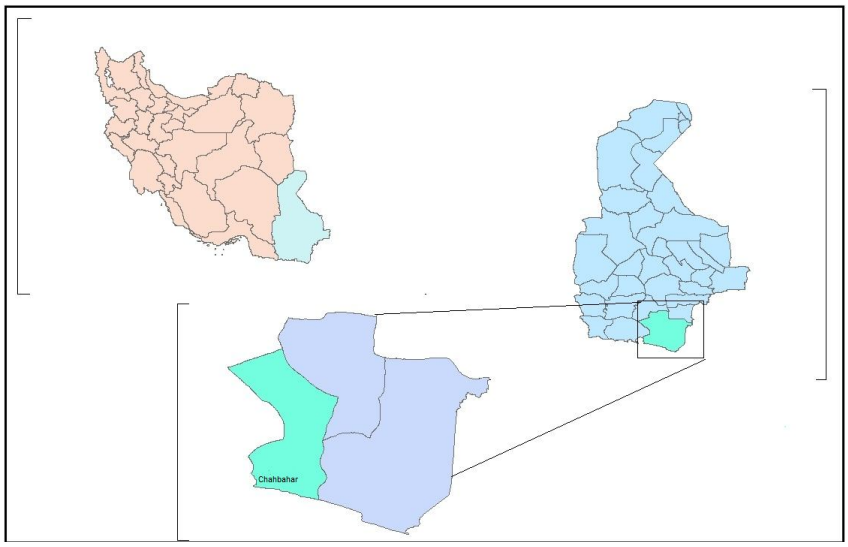


Figure (1) The location of Chahbahar town in city, province and country

Faults and seismicity in the region

Iran has been located on the Seismic belt of Alpine – Himalayan and considering that fact the faults and their movements and motions cause earthquakes, hence studying the location and type of the existing faults in the region have so much of importance. Tectonic activity in this area causes the emergence of big and small breaks and gaps in hard formations that the length of some of them reaches up to some kilometers. In Chahbahar region so many faults exists that its big and long faults are more of Longitudinal type and their movements are mostly Eastern-western. Another significant group of faults of the region are Transverse faults that often emerge in couple. Considering the historical Seismicity condition of Chahbahar is located in intensity lower than 6 Mercalli in the Zoning Map of historical earthquakes of the area. On the other hand, according to the contemporary Seismic intensity zoning map this city is located in a range of 6 Mercalli. As per the latest Earthquake hazard zonation map, Chahbahar town is located in the range of relatively high risk of earthquake and following 0.3 gal acceleration in buildings is necessary.

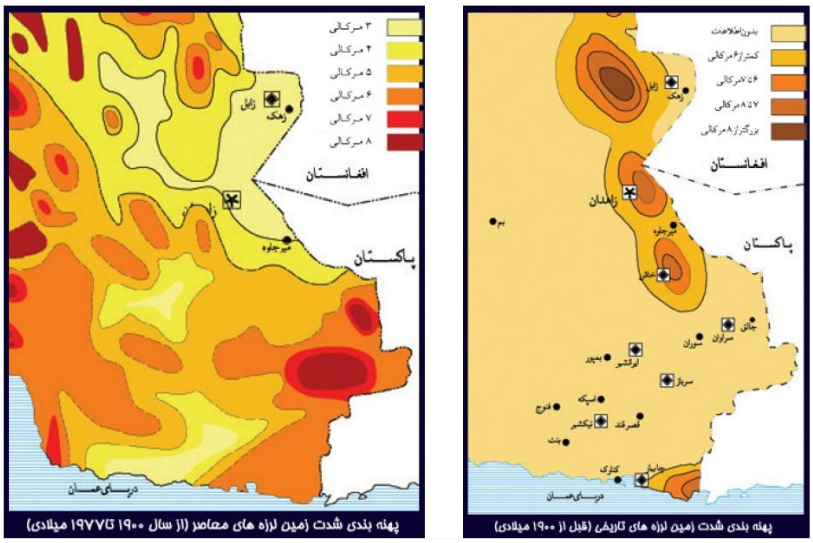


Figure (2) Seismic intensity zoning in the area under study

Analysis of the research findings

The location of the area under study in terms of land use

The area of the urban decay contains central and eastern parts of Chahbahar town. The area under study is 320 Hectares and includes town's market and Osmanabad, Shiriha and Korsar neighborhoods. In this section of the study the land uses in the urban decay of the town will be presented.

In this section of study we have tried to study the importance and the position of the area under study in the town from land uses point of view.

Residential use for the provision of the needs of its residents should be placed in adjacent to other uses. Some of the uses are required at the time of emergences and access to them can reduce damages, among which we can name: open spaces and parks and green spaces, Health & care spaces, rescue and fire stations.

The distance from fire station

This indicator is one of the main factors in expediting the aiding process to Accident victims. Hence, as much as this distance will increase, the possibility of on-time aiding will be decreased and therefore the vulnerability rate will be increased.

Distance from medical centers

Close distance from medical centers (hospital and emergency centers) at the time of after the occurrence of earthquake can have a significant effect in transferring the injured people in the least possible time to these centers for aiding them and rescuing their lives.

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Residential uses

Around 40% of the urban residential uses have been located in the urban decay and part of the town and this percentage of the residential texture due to Texture density in the area of urban decay and specially in the historical texture which is considerable and significant comparing to the lower density of the northern and eastern parts of the city which are together having a greater

area as well. also it should be noted that 67% of the total area of the urban decay belongs to the residential uses. In general it can be said that this area, with the exception of the Imam Khomeini Street, is an area with a dominant residential identity.

Land under Commercial use

More than half of the existing area under commercial use in the town is located in the area of old texture. Due to the existence of the town's historical center inside the area of the urban decay of the town, and since the old market of the city also is located in this area, in fact the main commercial center of the town is locate in this urban decay part of the town that most of them are locate in 9th and 12th neighborhoods and some of them are also locate in 10th and 13th neighborhoods.

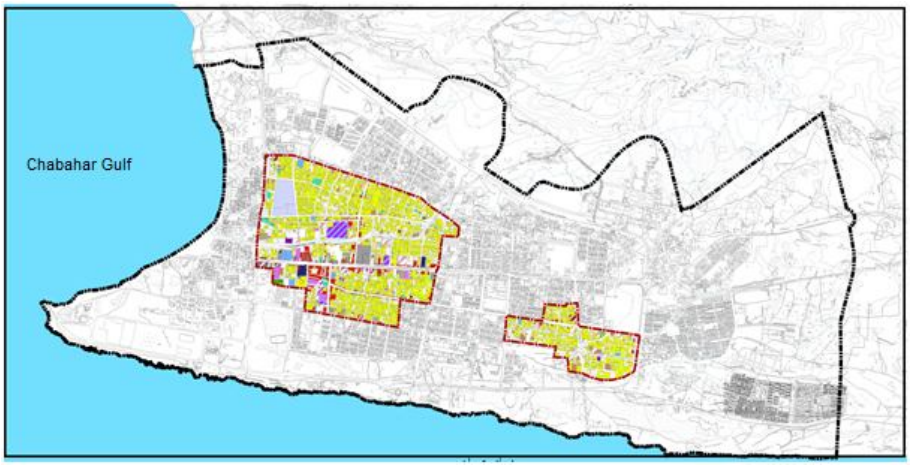


Figure (3) land use map of the land of the urban decay area

In total, after the land under residential use, the land under commercial use has allocated the highest area in the urban decay area to itself which is about 6.5% of the total area of the old texture. Of course it should be noted that due to the economic value of the commercial units, the area of the commercial area are so much less comparing to residential area and this high difference between commercial percentage and residential percentage of the area results from this very difference and the value rate of the economic sectors.

Studying the general texture of the city (gradation – combination of full and empty and blocks)

In studying the texture of the city among the most important factors we can mention factors such as: gradation of lots, blocks, and combination of full and empty.

The gradation of the lots indicates to the approximate size of the houses. In Chahbahar we see residential houses with large areas, such that even in the urban decay of the town which is located in the west part of the city also we are facing with big residential houses. Even in some of the Neighborhood such as Shiriha we are seeing lots with an area of 1500 square meters and larger. In some other parts such as Atash Abad Neighborhood it has lots with different sizes, in such a way that the size of a lot has been specified with walls and inside that buildings with areas less than 40 square meters has been built. In areas which there is breakdown plans such as Golshahr the size of the lots and the breakdown areas are to some extent regular and close to each other and follow a certain order.

The networks of movement and access are the next factor in the formation and giving identity to a texture. Internal networks in addition to playing the role of moving and transporting have a very important role in the Multi-way communications of the elements, components and functions

with one another and are considered as the Permeability factor of the texture, in such a way as we are facing with smaller blocks, the Permeability rate of the area will increases and will facilitates the access to services and if the town is consisted of bigger block the Permeability rate of the town will be less and in that case in accessing the services we will face some problems.
Two main axes of north-south and east-west of the town, although it has made so many changes to the structure of the town texture; however, have increased the Permeability rate of it. In fact these two streets serve as the spine of the town and will relate blocks and dead-ends with low Permeability to each other.

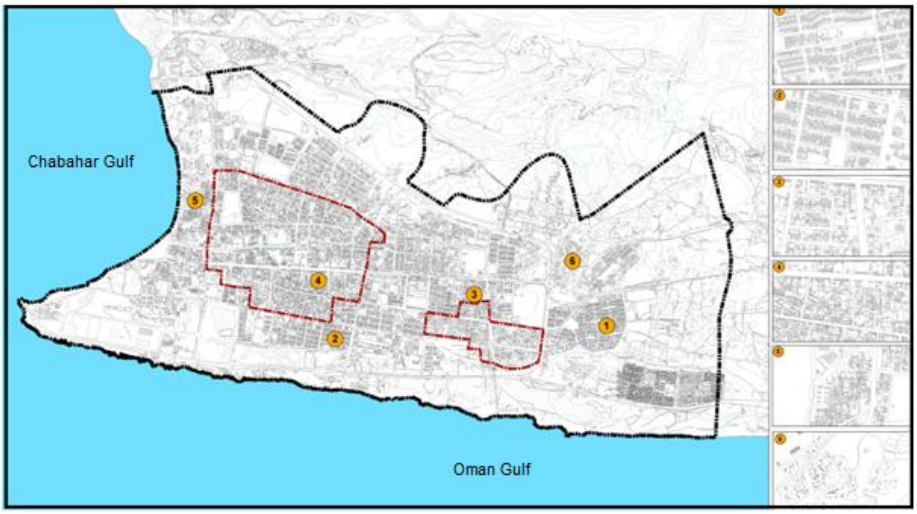


Figure (4) Map of the overall texture of the town

Studying the communicational network (access)

By access we mean the way of accessing different areas in the area during the occurrence of earthquake for aiding and rescue purpose during the first 72 hours (Hatami Nejad et al., 2009: 12). The main streets and roads are among the most important structures that their remaining intact after the occurrence of earthquake can have a significant role in controlling indirect damages (Tabeshpour, 2005: 12). Narrow alleys with bents after the occurrence of earthquake will be accumulated with lots of mud, soil and material from the destructed and ruined buildings which will prevent the possibility of any aiding and rescue process and in unusual and emergency situation resulted from earthquake the importance of quick and good access become double. In spite of the fact that urban decay are so much old and have been formed without any planning and with the passage of time its communicational network is not anymore suitable for the needs of the residents, in fact it is one of the effective land uses in reducing damage and expediting the aiding operation of the communicational network which specifies the ease of access to the site. In the area of the urban decay Chahbahar town in the Hierarchy of access, the Street networks are sub-second degree type.

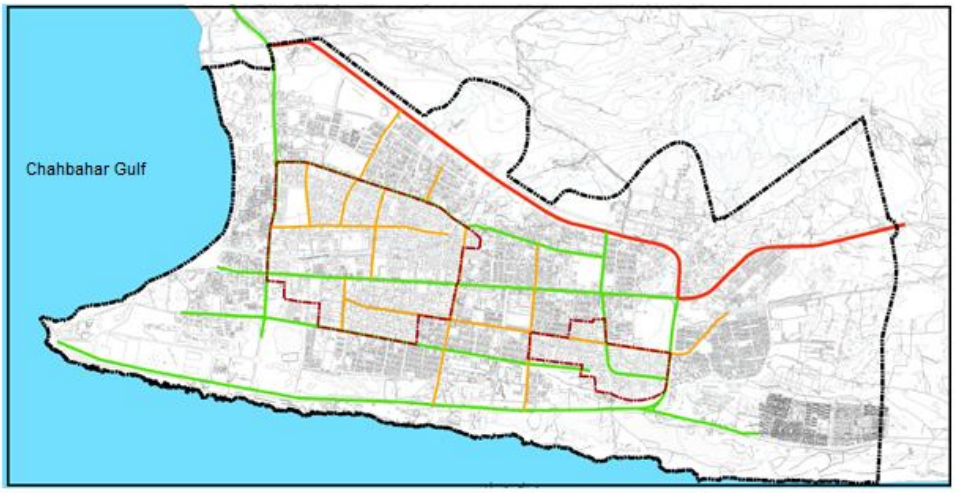
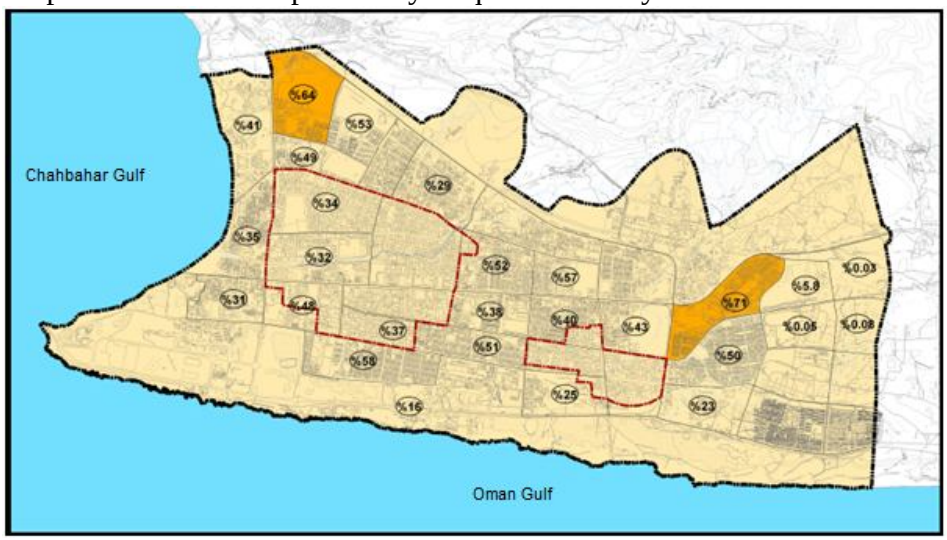


Figure (6) The map of communicational network

Building density

The bad condition of positioning of the key elements and inappropriate land uses of urban lands, inefficient urban communicational network, dense urban texture, high urban density, bad condition of the position of the infrastructure of the city and the lack and improper distribution of the urban open spaces and such other instances will increase the vulnerability rate (Shiravzhan, 2008: 47). At the time of the occurrence of earthquake those buildings which have been destructed will prevent almost the possibility of quick and easy access of the area to the main



Communicational axes such as hospitals and airports for expediting aiding and rescuing operation.

Conclusion

The occurrence of earthquake is a natural condition of earth not the wrath of God and we need to follow and create the proper and required infrastructure in the process of urbanism in our country according to the Principles of Engineering.

Crisis management in urban areas is considered as a measure that at the time of the occurrence of disaster and especially earthquake can to a great extent reduce the effect of emergency situation and disaster and includes four stages. Urban planning is considered as a factor which has a very effective role in reducing the effects of earthquake. Among the different and various levels of physical planning the most efficient one for reducing the level of vulnerability of cities against earthquake is the middle level or the very same urbanism and the existing concepts in urbanism such as urban structures, urban form and shape, uses of urban lands, urban areas, urban facilities and infrastructures including water, electricity, gas and telephone, communicational network of the city and … have important roles in the vulnerability rate of the city against earthquake. The area of urban decay of Chahbahar includes two parts which contains central parts of Chahbahar town and considering the following problems in this area some solutions are recommended.

Small gradation of the texture (small lots of the texture)

Inappropriate roads and streets (lack of access of care in some locations, existence of dead-ends, long and narrow alleys)

Lack of urban services and infrastructures (Recreational uses (open spaces), sport as well as old water, electricity and sewage networks

High rates of illiteracy and low rates of awareness of accidence and disasters

Solutions and recommendations

As it was mentioned earlier, one of the issues that we are more facing with in bigger cities now is issue of earthquake which has make it necessary to give attention to make planning toward making cities more safe and less vulnerable. One the other hand, any recommendation will be realized in a proper organizational background and it is possible that it will have some of the required elements and components and lacks the other ones (Zangi Abadi and Nazanin, 2006: 129). Therefore, in order to prevent the irreparable damage or reducing it we recommend the following:

- Reducing the vulnerability of earthquake through Immunization and retrofitting the structures and urban structures and installations;
- Designing the texture manamgnet and the body of the region;
- Provision of the correct management at the time of risk;
- Preparing a research bank of the close or effective faults in creation of risk;
- Matching the optimized pattern of urban uses of land with the existing condition and identification and modification of vulnerable elements and regions;
- Preventing Irregular and traditional construction;
- Increasing municipality supervision and follow-up of the supervisions up to the completion of the construction projects;
- Trainings the societies' individuals for dealing and facing with the emergency and risk of earthquake as the main factor of Passive Defense and implementation of Regular maneuvers during the year for creating readiness for dealing with the emergency and the risks resulting from natural disasters;
- Increasing the awareness level of the people through media such as radio, TV and …

- Using model and software such as Geographical Information System in Urban Crisis management and reducing the vulnerability resulting from natural disasters such as earthquake.

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