The Role of Urban Planning In Crisis Management with an Emphasis on Earthquakes
(A Case Study of Ahar City)

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Abstract

Nowadays crisis management relates as a science of beyond course to widespread case of sciences and experts and with respect to strategy, is a complex of science, art and action witch before, during and after crisis in order to reduction of affects of these events and decreasing of vulnerability is carried out. If the crisis management can be affective and opportunity of development of multi-dimension provides for the distraction, basement of planning before crisis will be ready and subjective. Among this, the science of planning and urban designing also appropriate to limitation of its own action, in recent years, in order to identification of methods for damage discount has been one of the most common natural disasters -meaning earthquake-in urban spaces as mankind major learning place. In this research, intending descriptive-analytical on by field reviewing of amplifying process of crisis management with urban planning in order to decrease of natural disasters especially earthquake in Ahar has been studied. Ahar city because of especial geographical location and lying between the Garadag and Goshadagh mountains and the existence of the route of floods and rivers inside it and adjacent to a lot of faults is apt to natural disaster such as earthquake. Research finding indicate that the city vulnerable areas has less access to rescuing and helping facilities and also most of its vulnerable areas is near to the historical, ancient areas and exhausted structures and also non-official residential centers around the city. In addition to these cases, the way of lying of vital vessels is not in an appropriate situation and in crisis condition is not responsible for needs.

Keywords: Urban planning, Crisis, Crisis management, Earthquake, Ahar City.

Introduction

The man is in the center of vulnerability and fight against crisis. One of the most important issues most people experienced in their life is natural disasters. Due to the unexpected nature of these events and the need to take proper decisions and measures, a basic theoretical knowledge has been created which is called crisis management. Using the principles and rules of urbanization and elaboration of the existing knowledge in the field, like the structure and contexture of the city, the use of urban lands, connection networks and urban infrastructure one can reduce the effects and consequences of these events. The UN committee, in a document, named sustainable developments of human settlement, suggested all countries to concern in all their planning processes and human settlement management, reduction of the danger of earthquakes (Ahmadi, 1997). In recent years, considerable measures have been taken about crisis and earthquakes and reducing their consequences in Iran.

However, in urban planning, lack of attention to the issue of crisis management and urban vulnerability against earthquakes is quite evident; however it must be emphasized that in most of the developing countries the capacities and capabilities of this knowledge it is being ignored in most of the cities in all regional and national levels in the country. In Iran, because of geological, tectonic, climatic and environmental features, natural hazards, particularly earthquakes, along with the growing trend of urban development and population, is considered as the most widespread concern in people’s lives. The wide mapping of the relative danger of earthquake in Iran shows that most of the residential areas are at stake, and it is low in just some areas of the country (Zili, 2006). According to the National Ministry of Roads and Urban Research Plan, 50 percent of the urban populations live in the areas that have the highest risk of earthquakes. One of these cities faced with the problem is Ahar. On one hand, because of the cities geographical position and location between Ghosha Dagh and Garadagh mountains and also ravines and rivers within it and on the other hand its proximity to faults, is very vulnerable to natural disasters. The other reason which increases the vulnerability of the city is the old buildings and settlements which generally consist of the houses of one floor or two floors built near each other. These houses lack the technical required standards and static resistance...
and high strength against earthquakes. The other problem concerning these houses is the limited and inappropriate access to these houses which complicates the process of the aid to these regions. The aim of the present study is to recognize the relations between urban planning and earthquake crisis management. The study attempts to study the present status of Ahar city and analyze the strength and weakness of crisis management to offer appropriate Solutions for improvement of the situation.

**Methodology**

The study used descriptive- analytical research method. Data has been obtained by using library resources, survey studies, and field observations.

**The Justification of Research**

It must be acknowledged that the status of urban planning in crisis management especially earthquakes and adopting strategies in dealing with it is very important. Unfortunately, because earthquake centers (cross hypothyroidism) in Iran are often not precise, earthquakes are often destructive and also have high destructive power. Considering the length of the active faults and their danger zone (20 kilometers around faults), 35% of the area of the earthquake is facing a serious threat of earthquake (Negharesh, 2003). According to the statistics, the seismicity potential of Iran’s cities with regard to their distance from the faults is: 16.6% of Iran cities are on the fault line or are located long them and approximately 68% of the cities are located at a distance of 30 km of faults that means these cities encounter more danger than others. 9.1% of the cities are located at a distance of 30 to 50 km (Grab Intermediate Zone) of faults and 6.3% at a distance of 50km (Zomorrodian, 2009).

Regarding this information, we should consider that with the development of the cities and urbanization and environmental and economical progress, if there was no effective management, the potential dangers would lead to aggravation of disaster (Nakabayashi, 1994). In urban domains, the threats might not be very serious but in human communities, it became a natural and technological crisis including physical devastation and urban dysfunction. If you have already planned for the city in times of crisis, crisis management along with urban management controls the situation and prevents spread of crisis. For instance, if no attention paid to living in the suburbs it could change to living in cabins or on the other hand if it managed well could change to planned suburban life. With this regard, we need a meticulous plan to increase community preparedness encountering future crisis and resistance against them. Since major part of the plan concerns people from different classes, the role of humanities is very important in this regard.

**Theories of Research**

**Definition of crisis**

Crisis is defined as a situation that occurs unexpectedly as a result of natural events and human actions, disturbs human life, and needs urgent and instant measures to be taken. In other words crisis is a situation which disturbs main systems and subsystems (Hosaini et al., 2009). The aggravating elements of crisis include lack of information, lack of proper decision and the lack of serious measures to encounter the problem.

**Comprehensive Crisis Management**

Planning process is an action taken by the government agencies, NGOs and the public to recognize and reduce the risks (risk management) and to manage operations to recover and rehabilitate damaged areas (crisis management). In the process they try to find the markers and analysis of integrated and coordinated use of available tools to prevent the crisis and if they occur counteract measures carry out to rapidly return the city to its normal condition (Abdullahi, 2012). When a threat managed properly, a crisis can be prevented or its effects can be reduced or even can be changed into an opportunity. Each crisis often has a merit and it could be a failure too. The most important part of crisis management should be devoted to crisis prevention and preparedness for natural disasters meant to be directed at reducing the risks and vulnerabilities. According to Pearson and Claire, crisis management is systematic efforts by members of the organization along with stakeholders outside the organization, to prevent crises or manage them effectively (Mc Conkey, 1987). A common mistake that happens in crisis management is to suppose that there is always a solution for each problem; we should take different plans and programs and implement them to control crisis. In Iran, The National Crisis Management Organization is responsible for consistent management, planning, harmonizing the fields of research administration, providing integrated information, monitoring different phases of crisis management, organizing and renovating damaged areas and using tools to encounter natural disasters. Organizations are affiliated to the Ministry of Interior and the other organizations in cities and provinces are working under the superintendence of mayors. Crisis management involves the following steps:

- Understanding the problems through available information and news about the crisis.
- Describing and formulating possible options to control and harness crisis.
- Lowering the various costs to just one option and choosing the best strategy.
- Assessing negative and positive feedback about each strategy.
- Understanding the vulnerabilities and threats.
- Analyzing risks.
- Responding Crisis.
The process of urban planning includes three main steps: Recognition of the present status of the situation, analysis and final planning (Shiee, 2006). It seems that by merging the process of urban planning with the steps of crisis management including preparedness, response and recovery, could results could be achieved. Training urban managers to deal with the crisis and to supervise constructions is considered as one of the most serious actions in facing crisis. Just looking at the specialty of urban managers (including mayors, governors and deputy governors) is sufficient to find serious revisions and equipment to deal with natural and environmental crises.

**Earthquake Markers**

As it was mentioned, the first step in crisis management is the recognition of bases of crisis and collecting information to provide mappings of hazards and assessing them to formulate a realistic look rather than idealistic. The earthquake is defined as a sudden motion or vibration in the earth which originates from limited areas named epicenters and the energy released is dispersed in all directions (Sedaghat, 2011). Before the earthquake happens some changes and signs occur which are used to predict the earthquake; they are called earthquake markers. Many cases is studied as earthquake markers in the world, among them are sudden changes in the tides of continental crust, the return of the ionosphere wave amplitude and change in surface heat flux phase anomalies, atmospheric temperature and humidity of the air, formation of clouds, earthquakes and abnormal behavior in animals. Concerning heterogeneity of the earth, all these markers don’t happen all at the same time, depending on regional, geologic and tectonic condition of each area; just some of these markers are important (Yazdani, 2007). So the study of this case regarding tectonic and regional situation of the region could be useful in knowing when and where earthquake might happen. With this interpretation, earthquake is of conventional criteria of human life and exceeds through life. But the key issue is what kind of attitude and mechanism minimizes the scope of the crisis, losses, and finally normalizes dealing with the crisis.

First we should create the outlook that the earthquake is a usual thing in our country and we should encounter it with a strategic look in scale development strategies. Such an approach no doubts should think to retrofit 80% of the buildings that are fragile in the face of severe earthquakes and provide resources and executive organization to deal with it. For example, the mean of different estimates shows physical damages (housing, infrastructure and facilities) of Bam earthquake to be about two billion dollars and if we add the human loss and long-term economic consequences, it reaches a figure of about $ 4 billion; Much of the damage caused by an increase in non-normative constructions, particularly unplanned population growth and urbanization plan. According to experts’ calculations, the cost of retrofitting buildings in Bam was less than 10% of the total construction cost. From the factors affecting vulnerability to earthquakes, institutional and political dimensions has the greatest impact (such as problems related to urban planning legislation and the lack of comprehensive legislation) and then, the economic dimension (such as insufficient resources to manage risk and poverty) and finally social dimension - cultural (such as low and inadequate knowledge and awareness) was effective (GTZ, 2002). First vulnerability indicators should be determined to decide and plan based on them. Indicators of vulnerability to earthquakes include: a) Structural indicators b) planning indicators.

**Vulnerability Indicators**

Seismic Vulnerability of areas are can be assessed by Evaluating spatial multi-criteria’s including (Alavi, 2012)

- Vulnerabilities due to being away from outdoors
- Vulnerability due to population density
- Vulnerabilities caused by damage to the buildings
- Vulnerability due to age and type of building structures and materials
- Vulnerability resulting from separate parts of building
- Vulnerability due to number of floors of the building
- Vulnerability due to lack of proper access to the street network
- Vulnerability due to slope
- Vulnerability due to lithology
- Vulnerability due to closeness to the fault

Given the theoretical knowledge of earthquakes, the present study investigates the role of urban planning in earthquake disaster management through a case study.

**Geographical location of the area**

Ahar is a city in East Azerbaijan Province, Iran and it is also the capital of Ahar County. The city with the areas of 93.3073km² devoted 76.6% of the whole province to itself. It is located on 45 minutes to 47 degrees 33 minutes. North of the city is limited to Kaleybar, West to Varzejan, South to Heris and East of Meshkinhshahr city of Ardabil province. Ahar is the largest city of the province; it is in Arasbaran region (QaraDaghi) and is also known as a center of this region. This historic town is located 90 km North East of Tabriz with a population of 92,782 according to the 2012 Population and Housing Census (Statistical Center of Iran, 2012), and is the fifth most populated city of the province in East Azerbaijan province. Ahar is an area of 1378 hectares.
Ahar is 1360 meters above sea level and is located at 47 degrees 4 minutes on east longitude and 38 degrees 48 minutes on north latitude. The city is located in a mountainous region in North East Mountains, Bozkosh in South and Qushadagh in South East. Also Aharchay Rivers and Rangulchay and Alirezachay are in south and west of the city respectively. Ahar has three climatic phases tropical, cold and mild. Cold and dry months are between 5 to 8 months, annual rainfalls are 250 to 400 mm, its humidity is 82%, and the maximum temperature is varies between +34 to -22 °C degree. North - South route of Kouchakchay River divides Ahar into two Eastern and Western halves, and the main streets of East - West Imam and Shahid Rajai city also split the city into northern and southern halves. Ahar by these factors is divided into four regions and fourteen districts. First region is an area of 335 hectares located in the northwest of Ahar including the districts 1, 2 and 4. Due to power transistor masts the significant part of the region is devoted to the green spaces passing middle of the land with the potential of expansion. Second region is in southwest area of 7/342 acres, including districts 3, 5 and 6. The main thing concerning this region is the design of local roads to Varzeqan. Transmit towers also affect planning. The third district is situated in the southeast area of 368 hectares, including districts 8, 9 and 10. Some of the major city services such as transportation, storage and use of industrial workshops in the area and Meshkinshar north road are proposed based on the general policies of the comprehensive plan. Southern junctions and Eastern bypasses which extend to Kaleybar are located in this area and significant land is considered for its boundary. The fourth area is situated on the northeast side of the city along with Sheikh Shahabaddin town, an area of 7/230 acres, including 7, 11, 12, 13 and 14 districts. Among the most important issues concerning the region is Sheikh Shahabaddin town with distinctive city services which is of high importance to the city. Also there is a regional power distributing post and power transitory masts which limits the development of city.

Geologic and structural position of Iran and Ahar

Geologic structural of Iran and its borders is related to the third age of geology. This shows a positive potential from mineral resources and economical perspective and a negative potential from seismic strokes (Ramezani & Gourabi, 2006). The country is on middle of Alpi organic belt and this stroke is not finished and the final balance is not achieved yet. So regarding Iran’s position between two old continents, Euro-Asia in North and Africa-Saudi Arabia in south, the country has a fragile platform which existence of many active faults is an evidence for this (Zomorrodian, 2002). Geologically Ahar is located in Alborz – Azerbaijan zone. Important features of these zones are their rocks similarities with Precambrian, Cambrian and Ordovician of the Central Iran. The intensity and variety of tectonic activities in Ahar caused movements in different parts of sedimentary and igneous rocks and as a result created faults in this region.

The main fault which created geomorphologic events in Ahar is the north Qushadagh fault (Dallaloghli, 2004). Based on map-based Institute of Seismology and Earthquake Engineering Earthquake hazards, Arasbaran is faced with moderate to high
earthquake risk. In Ahar faults and large fractures trending northwest - southeast, this can be noted Farm faultes, North of Ahar, Khamide Vande Abad Kojan. In North and West-North, there is no fault to limit residential areas; while in south and south-west there are faults which hinder development in the region (Ranjbar, Rashidzadeh, 2012, 32). Highlands of this region took the present form because of Alpine orogeny phase. Topography of the city is influenced by the formation of Qaradagh Mountains in the north, in other words Ahar is considered as a part of the mountains. Besides, the northern slopes of Qushadagh Mountains constitute the southern part of the city. Qaradagh Mountain along with activities of Aharchay Rivers and partly Qushadagh Mountain is the main cause of morphological status of Ahar region.

Ahar and Varzeqan earthquakes

On August 21st 2012, two earthquakes struck Ahar and Varzeqan. According to Institute of Geophysics, University of Tehran (IGUT) and US Geological survey (USGS) the first earthquake happened with a magnitude of 6/2 on the Richter scale at 12:23:15 UTC (at 16:53:15 local time) about 17 miles West of Ahar in coordinate system 495/38 degrees in north latitude and 46/865 degrees in east latitude. The second earthquake happened with the magnitude of 6 Richter in 10 kilometers of Varzeghan, 38/449 degrees north latitude and 46/731 degrees for the east at 12:34:34 UTC and 17:04:34 at local time. Both the earthquakes epicenters were at a depth of about ten kilometers above the Earth. Based on the observed structural damage, seismic intensity at the scale ranging from macro-seismic Mercal was estimated to be lo = VIII.

Earthquake was also felt in West Azerbaijan, Gilan, Zanjan, Ardabil and The Republic of Azerbaijan. After the first earthquake, more than four thousand nine hundred aftershocks have been recorded in Arasbaran region of East Azerbaijan. According to official statistics, 306 people were killed and more than 2,500 injured. A total of 155 thousand people were affected by the incident, 67 thousand people were from Ahar. South fault of Ahar (QushaDagh fault) was introduced as the causative fault of the event; other factors seem to be powerful enough to produce such cross motion. Ahar fault is located near the east-west and in nearly 80 km of north Sabalan. This fault is a fault zone with a width of approximately 200 meters across the Tabriz-Varzeqan road (Geological survey of Iran, 2012).

Seismicity of the twentieth century Ahar and its surrounding areas

The widespread seismic studies in 1 degree and 1 epicenter shows that around 380 seismic events happened in the last century, 19 of them were about 5 or more than that. The statistics shows high seismicity in Ahar and its surrounding areas. The largest earthquake is related to the republic of Azerbaijan on April 27, 1931 in surface wave scale (MS) with the magnitude of 6.4 (Eslami et al., 2013).

Damages inflicted on buildings and structures in Ahar earthquake

- Engineered structures: In earthquake-stricken areas all engineering structures including concrete ties, electrical and TV masts and office buildings, and schools have been stable or have had minor damages. Also newly built structures in some areas had minor damages and have not experienced any detrimental damage.
- Non-engineered structures: Non-engineered buildings in earthquake-stricken areas include adobe and mud ceilings. Cement block or brick buildings with wooden beams are seen among them. Adobe and mud buildings are heavy and don’t have any column or inhibition on walls and ceiling, so lack of shear resistance of walls and sufficient coherence of buildings components and the low resistance of brick and mortar caused their big damages. Most of these structures in earthquake-stricken areas have been destroyed around 30 to 100 percent. According to estimates and assessments made by East Crisis Management Committee, the amount of damages of East Azerbaijan earthquake was more than 403 million Dollar. Highest records of damages in Ahar was126 million Dollar. Urban housing areas with more than one thousand 46.3 million Dollar has
experienced the greatest amount of damage. According to the Tehran Housing Foundation Headquarters in Ahar about 14,526 repair units, 1598 build units, and 60 commercial units were refurbished and renovated by the staff. Application of urban planning in earthquake crisis management.

Urban land use

By studying land use in Ahar, one could conclude that there was no reasonable relation between city uses, land allocation and the budget devoted to them, and in determining land uses standards were not met as for social justice, acceptance, adaptation, capacity and neighborhood, incompatible applications have been put together. Thus the most urban infrastructure is dominated by residential buildings in the city, and also city uses are distributed in a way that caused centralization and in case of encountering crisis complicates city problems. Another point is how to deal with urban land, which mostly centered on economic issues and demands for land.

Old urban contexture

In Ahar old contexture usually can be seen in historical and old areas of the city, which because lack of adequate infrastructure, environmental problems and high pollution, poverty and deprivation, vulnerability to earthquakes, high density of population and social problems, impairs and disturbs the system of city life as well as the construction and operation of critical components of the city. In addition to old contexture, peripheral contexture (informal settlements) which are more marginalized and are formed with no regard to formal programs faced the city with problems. Inhabitants of these areas are low-income groups’ rural migrants and poor families; they are built with no immunity, strength, security, urban infrastructure and services.

Urban Street Network

Ahar street network currently has no regular hierarchy and structure. The network obeys a checkerboard structure. Unlike most of Iranian and underdeveloped cities of the third world which has a network hierarchy and follow linear structures, Ahar isn’t like that. Its network is a decentralized system in which there are a large number of nodes or intersection. Diagonal streets are used to shorten the route distance and long trips. The main disadvantage of this system is compressed, unbalanced and dangerous intersections at the junction of streets and diagonal checkered. In addition, the number of street intersections in the grid is high. The relationship between the center and the main parts of a city are generally of two types: a) connection through beltway streets B) connection by straight streets. Ahar Main Street linking the east - west Imam and Rajai streets and North - South and 35 meters SahebZaman, which makes the main framework of the city transportation. Network connectivity can be integrated into the ring and checkered and a combination of them. Another notable point about Ahar is the square located at the juncture of four major cities of Tabriz, Varzeqan, Meshkinshar and Kaleybar.

Open spaces and Parks

According to studies in the neighborhoods of Ahar, green spaces and parks are not compatible with urban per capita. The city has two regional parks: Velayat and SheikhShahab and also 11 regional parks which it was made known that in earthquake can’t fulfill the needs of the city. The spaces which was designed for recreational purposes (parks) and public places under normal conditions, provided temporary housing for disaster victims; they should be updated to the meet the needs of society and developed by creating appropriate infrastructure.

Figure 4. Critical areas of housing and informal settlements of Ahar city.
Discussion and Conclusion

Nowadays, the field of crisis management knowledge and expertise is associated with a wide range of fields. Knowledge-based crisis management is a combination of science, art and practice. Crisis management can be fruitful and provide multi-dimensional development opportunity for the region to create an accurate plan before the crisis. The earthquake is one of the most common natural hazards that threaten urban spaces. In other words, the more the investment for developing and improving the foundation of a society, the less negative consequence and accidents would be. One of the most common dangers of natural disaster is earthquakes which threaten the urban areas. The crisis resulted from earthquakes caused researchers to plan and design strategies for crisis management to reduce its detrimental effects. In recent years, the knowledge of urban planning regarding its use attempted to find ways to reduce earthquake damages in cities which are main habitats of humans. The criteria and factors leading to vulnerabilities of the cities are common, to a large extent, in all cities, for instance accessibilities of houses to open spaces is effective in vulnerabilities (especially in crisis). So identifying and localizing these criteria in a case study is considered as the main unit of analysis in the current process of urban planning. The process of planning and principles of urban design should be in terms of two overall program, crisis prevention and crisis mitigation. Offered Measures and policies controls and leads the dimensions and quality of urban development, should have policies and special measures to prevent the crisis and reduce vulnerabilities. So planning priorities can be expressed in brief; prevention of discrimination and illegal constructions in areas 10 and 11, especially Chale Bran neighborhood, construction of parks in neighborhood, construction and completion of the main road network, provision and improvement projects and repair of worn out contexts and peripheral sites of Qods street and prevention of illegal separations outside the legal boundaries of the city, into a deserted cemetery, the city’s public spaces such as green spaces and cultural spaces, canalizing the rivers and ravines and their development. Finally it can be concluded that planning is a tool that optimizes the current situation, then it is better to cooperate with people to see the results and reach to a sustainable development.

Proposed plan of earthquake preparedness and crisis management in Ahar

- Prevent construction of non-standard houses by considering 2800 standards, and monitoring all the construction by experts, mainly in the neighborhood of Chale Bran and Bahramabad. Total housing units in Ahar city based on population and housing census in 2012 is 37,066 units, 18756 cases in Ahar and the rest elsewhere in the city and only about 13,859 of them are steel or reinforced concrete.
- The cities seismically safe spaces with regard to ground conditions, topography and seismic hazard zonation studies should be determined to help urban planners and managers to reduce the effects of the crisis. Faults zone based on the fault is variable. There shouldn’t be any construction and population density in these areas. The role of passive faults, like the southern fault, in creating the Ahar earthquakes is undeniable.
- The distribution of fire stations, rescue in the city should be appropriate to the vulnerabilities, population density, time, and distance. The stations must be in close proximity to main and urgent roads in order to respond fast to the operations. Regarding Kuchakchay River which divides the city into two parts, the eastern and western, and the possibility of disconnection between them in crisis should be arranged beforehand. Fire Station No. 2 position in Sheikh Shahab of Ahar is partly right, but the location of the station 1 located in downtown does not seem suitable. In addition, there is a need for a new station in the southern area. Location of centers and health care facilities should be considered as well. The southern and western parts of the city are equipped with Health care centers but the eastern and the northern parts lack such centers.
Complexity of social and frameworks of the city needs urban and crisis planning for which we need the modern technologies. The most current need in Ahar is cadastral maps and GIS mapping to make an integrated urban management.

Development of infrastructure and communication network and convenient distribution of population movements in the network. In urban transportation networks there should be routes with immediate connection to suburban transport network pace to perform tasks related to crisis. Southern bypass of Ahar is like this, but for the North and East and west of the city substantial measures should be taken. Also, due to insufficient width of streets in Ahar, passing fire engines and rescue in case of crisis is impossible. In order to minimize this problem, measures should be done to amend and widen roads and streets, especially main streets, including Imam street, Shahid Rajai and Sheikh Shahab because after the potential earthquake like 2012 earthquake most streets of the city will be closed and make transportation impossible.

About the city users in cities vulnerable to earthquakes two strategies should be adopted: One is users planning for normal condition of the city and the other is the planning to meet the needs for rescue equipments and even more important than that reducing damage to physical, economical and social systems. In other words like stable infrastructures of the city, there should be flexible and portable facilities and infrastructures. In Ahar such infrastructures are rare and there must be plans to make them.

Open spaces away from tall buildings in neighborhoods and schools which are equipped for temporary accommodation having facilities like electricity and communication should be identified and predicted. The problem of these spaces in the northern part of the city is somewhat resolved, but the southern half should seriously be considered.

Categorizing defensive areas of city: dividing the town to several anatomical areas to facilitate crisis management operations, locating helicopters landing spots for transmission of people, creating a field hospital located in any areas of the city, public education to citizens.

Due to crossing the river from the city center crisis management can be individually programmed to both sides of the river. Strength of the East-West road bridges which is the only way to link the east and west of the city should be considered seriously.

The motivation and attention of authorities to earthquake to form a crisis management committee to review current plans and activities and estimating vulnerability of different areas of city is needed.

References