



Earthquake Effects on Water Line Life in City and Designs against Crisis in Accordance with the Term of Iran



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Abstract

Human have been grappling with natural disaster especially earthquake since the last and through this way has suffered many casualties. But resulting experiences suggest that, earthquake with similar characteristic didn't have the same outcome. But several factors such as, lands inappropriate for, poor design and construction of buildings and urban infrastructure are often line life such as gas, water, electricity and ... and they're fundamental structure and generally linear current networks that provide the people life necessities and because of the linearity, the downtime of the network component affect the flow downstream and thereby service to downstream is discontinued. On the other hand the damage to the life line can be led next disaster, crisis and major losses. In some cases it could have more casualties and damages more than initial events. According to the above we can conclude that without a doubt one of the most important cases of earthquake crisis management is life line management and it's the thing that should be considered as special . so in this paper designs against crisis in accordance with the term of Iran were presented in the optimal ways by examining the water life lines in application ways and in accordance with the term of Iran.

Key words: Earthquake, Urban infrastructures, Water life line, Crisis management, City

1. Introduction

With the expansion of cities and urban and gradually increasing of the number of the large cities in the world, on the one hand Especially in developing countries such as Iran, Urban development Concentration and accumulation of people Increasing of environmental loads and economics context of them on the other hand while more attention to urbanism, has led to accept of numerous roles

and functions. One of the topics that most major cities in the world are facing with it, are natural disasters. Due to the unexpected nature of most natural disasters and the necessity for taking quick and correct decisions and operations, Fundamental theoretical and new branch of science as crisis management has created [1].

Planning process and actions of public officials and administrative agencies are said to be crisis management. It's trying to prevent the crisis by using tools, observation or analyzing the crisis comprehensively and coordinately or if they occur they're trying to reduce the effects, make ready, fast relief effort and improve to achieve normalcy and reconstruction work. In other words, crisis management is an applied science that through observation, examining and analyzing the systematic crisis are looking for the tools for preventing the crisis and if it works they're trying to reduce the effects and give a rapid relief to improve the faults [2].

The other hand, crisis management can be seen as a strategic management. Strategic management is a coordinated comprehensive and continuous program that can relate the organization outstanding talents to the environment. In order to realize the organization objectives in the framework of implementation of correct management [3]. In this regard and according to this process that crisis management involves three stages. These three steps are: Preparation against the crisis, relief and response in emergencies, recovery and reconstruction after disaster [4]. With regard to crisis management as a strategic management inevitably, the strategic of crisis management must be defined. Strategy is thinking and way of thinking; its Goal is setting, planning and systematic classification of the motion and should be done according to the special priority and sequence. Then, base on the best sequence, and the specific methods can be selected [3]. According to the strategy defined undoubtedly life lines is one of the effective priorities of crisis management. However, human use and enjoyment of the network, water, electricity, gas and communication supply facilities cause acceleration and facility of convenience and the other hand, disorders and shortcomings in each of these facilities can cause the current activities and social life. In other words, without the enjoyment of water, electricity, gas and telecommunication facilities, living is impossible in today's society. Thus the service provider network and facilities have been named Lifeline.

On the one hand, lifeline importance role in the crisis comprehensive management of urban and interconnected network with, and on the other hand, their economic value, make us to have a special attention to them. So it's necessary to have a compiled and detailed program for handling and examining the life lines especially in natural disasters [5].

Without doubt with regard to the role importance of life lines in civil engineering structures, it's so clear any delaying in life lines reconstruction, regardless of reconstruction priorities cause substantial damage in the structural and affect on the social dimension. In this paper design against the crisis is presented properly, by using the descriptive research method - analytical and Gathering information with documentation methods, while examining water life line applicably in accordance with the term of Iran.

2. The importance of crisis management of urban infrastructure

Crisis management refers to a set of knowledge activities which are trying to reduce the effects of disasters and reduce vulnerability before and after the occurrence of natural disasters. This subject has a special relationship with planning issues of geography and urban management. . Applying the

principles and urban criteria and explaining the concepts in the knowledge such as, form, texture and structure of cities, land use, urban networks and urban infrastructure can greatly reduce the effects and consequences of accidents, on the other hand, urban management and city administration can also be effective factors in reducing the effects of these events [6].

From the discussed cases urban infrastructure, which are a kind of Lifeline Are special significance, life lines of fundamental Structures are generally linear with current networks which are providing the necessities of people life. Compared to buildings, life lines are important in this respect that degradation of the network caused widespread damage and service outages to downstream areas.

From the viewpoint of crisis management, lifeline damage has two different effects. First, the damage to components or parts of the network cause interruption service to downstream recipients, If the interruption service occur for consumers with high importance or ordinary consumers with the large number and wide range, could be due to formation of another crisis. On the other hand life line damages can cause disaster crisis such as fire, explosion and the next major losses.

3. Water life line

3.1 Recognition system

Source of water in cities is usually the intake of dams and wells. Flows of this resource are entering to the refineries through pipes or raw water channels. Purified water is dispersed by main pipeline to storage tanks and is reached to the consumers. Water transportation is done by the pump house or the gravity method.

3.2 Vulnerability of water systems

3.2.1 Water supply pipelines

Location of the pipeline damage can be assessed in points: crossing the fault, the tube connecting to the large structures and the general area of buried pipes. In all three points the major weakness is the joints even in normal condition, no critical operation and there are also leakage and water loss in the vital network. In case of severe shaking caused by earthquakes and distancing the adjacent pipe from each other at the junction, increased rate of water loss, cause severe injuries of the type of performance, even in the less damaged parts of the city. In addition, water leakage can also cause several risks such as subsidence passages and buildings. Possible fracture of the tube is not unlikely when the pipes are crossing to the faults.

3.2.2 Water supply facilities

Due to the location of seismic and other influencing factors, water supply facilities should be included such as: refineries pump houses, reservoirs and etc. Considering to the importance of facilities, construction year and the used standards were studied to determine the effect on each of these facilities. Due to the importance and role of each facility financial resources are available to the corrective action plan.

3.3 Addressing Scheme

To reduce the risk and fight the crisis and providing the needed water after crisis, following actions must occur:

3.3.1 Precritical

Retrofitting and overcoming weaknesses in the facility and lines within the framework of funding network with the priority of upstream facilities.

Reduced effects on the degradation of water providing, in other words, creating flexibility in facility centers and the important existing network can provide current from the other path in case of damage or loss of a pass.

Examining and creating the preliminary feasibility for preparing the needed emergency water for human consumption, vital centers and fires.

Preparation the needed tools and items for emergency repairs and reconstruction after disaster

Training and requirements preparedness which is necessary for the organization and organizational after the crisis, for repairing, rebuilding and providing emergency water to take action.

Educating and informing people of how to provide the water after crisis.

Maneuvers to enhance the capabilities and preparedness the personnel and also, coordinating among relevant agencies.

3.3.2 After Crisis

Emergency plan is required to facilitate the rapid restoration of irrigation systems and to supply drinking water immediately after the earthquake for consumers. Taking adequate measures against the crisis is so important which establish balance between retrofitting of facilities and emergency measures.

Methods of water supply emergency: Emergency water supply plan is important for easy implementation of water. Water vehicles with emergency operations centers (such as tankers and fire fighting) in addition to irrigation of people when the traffic and roads were organized after the earthquake, can play an important role for transforming water to the temporary water tanks, critical facilities like hospitals and places of temporary accommodation.

The proposed job description for irrigation: the main candidates for assistance in emergency irrigation, municipalities, water companies and others are volunteers.

An emergency irrigation to critical facilities: since, long time is needed for enhancing the important facilities distribution pipes. Temporary housing sites should be selected primarily as a site emergency water supply. Irrigation to hospitals is needed to be done by water tankers.

Emergency response plan for water supply: Emergency response plan is in three phases as follows:

Phase 1: Forecasting, analyzing, listing and preparing the emergency response.

Interim deal, during the crisis, rapid repair of damaged areas lead to minimize the reach areas without water service. Therefore early and temporary repairs are necessary to be done to increase the throughput with the least facilities before the complete repairs. The temporary deal require following three activities:

Preparing the needed equipment for emergency operations.

The needed Equipment for repairing would be enough available in stock.

Temporary repairs: if it's possible that the secondary disasters or extension of damages occur before recovery of damaged areas, some activities and temporary repairs can be done quickly in the following cases:

1. Water facilities, reservoirs, no water transmission, treatment plants and storage tanks
2. Networks and water distribution lines
3. Water supply facilities

Phase 3: Recovery Measures

1. Recycling facilities, water and raw water transmission
2. Recovery of refineries
3. Restoration project pipeline

4. Conclusions

Disaster, are very important issues that, states and nations were involved each year and many casualties and financial losses are imposed on them. Iran also has been excluded from this provision; there are several different types of natural disasters such as floods, earthquakes, landslides and the non-natural disasters such as traffic accidents, plane crash in different parts of the country. All of these factors in increasing of urban population and Growth of various industries, severe climate changes, the incidence of new microbes and widespread epidemics are indicative of crisis management. According to the discussions we can conclude that the crisis is the inevitable issue but measures and strategies against crisis to reduce the possible losses are so important and necessary.

Considering to the water life line for crisis management in this article and regarding the situation in cities for reducing further human and financial losses the following suggestions as practical and operational strategies to achieve this goal about the city will provide:

1. According to the location of urban settlements, it is necessary for managing the earthquake disaster and reducing the impact of them some following cases would be done for urban settlements:
 - a. We can specify the status of soil and rock types by a suitable plan and studying carefully.

b. Historical records of earthquakes occurred in order to better understand the seismicity of the region to be studied and analyzed.

c. For preparing and managing the crisis the return period of earthquake (activity and the rest of fault) must be examined.

d. According to the high seismicity of more cities in Iran, precise zoning of high earthquake risk areas should be prepared for considering the location of important facility.

2. According to the crisis management of urban construction to avoid losses of civilian life and financial, following cases for construction would be considered:

a. The possible effects of the earthquake should examine particularly in the construction of the old context and creation of human financial losses can be prevented by presenting the necessary plans geometric correction of passages and other reconstruction projects and retrofitting

b. Architecture and urban planning regulations were developed with the aim of reducing vulnerability and each of the organizations duties were clearly specified.

c. Due to the uncontrolled growth of cities, regardless of any of the terms and conditions, in recent decades, municipalities are preventing these construction activities seriously.

d. since selection of Urban Land current location was formed during the ime and there were not a correct and complete control over the construction activities, so it's necessary to locate and make the critical and sensitive center of city such as power plant, hospital, life lines properly and in accordance with the rules and principles of engineering.

3. Crisis management plan to protect more cities

and thus reducing vulnerability and loss of human and financial crisis should be prepared in different time periods.

4. Informing and educational programs have an effective role in reducing disaster damages and losses, implementing educational programs through mass media like television and radio, produce newsletters and brochures, installing the advertising banners, training in the field of crisis management of natural disasters

before the event, during and after its occurrence can be an effective role in promoting public awareness, Finally, harm reduction and human and financial losses can be reduced.

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