TECHNICAL CONSIDERATIONS IN DEVELOPING THE FIRST EMRGENCY OPERATION CENTER (EOC) OF IRAN AT TEHRAN

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ABSTRACT

A review of the impacts of Iran's recent earthquakes depicts that the lack of an appropriate Emergency Operation Center (EOC) in the affected areas, caused many difficulties in coordination of emergency response activities. This shows the importance of establishment the EOC's in big cities, like Tehran. According to the worldwide experiences in this field, EOC's should fulfil many criteria to be operational at the time of crisis. Besides of necessity to have earthquake resistance structure, these facilities should have specific design, architecture and infrastructures. In addition, many facilities such as damage estimation and emergency communication systems should be available at these centers. Furthermore, they need to have emergency operation systems and initial action plans as well as sufficient experts to make these centers operational continuously in 24/7. Considering these points, Tehran Emergency Operation Center has been developed during recent years. In this paper having a look on the worldwide experiences, the main items in developing Tehran EOC will be presented and discussed.

INTRODUCTION

Based on the definition of the World Health Organization preparedness include arrangements and measures set by the government, organizations, communities and individuals to make them able to provide rapid and effective response to undesirable conditions subsequent of disasters (WHO, 1986). Considering this definition, the level of preparedness in none of the major earthquakes in Iran was not appropriate. One of the most important subjects in improving the preparedness is operational Emergency Operation Center (EOC). Again the situation of EOC's in the earthquakes occurred in the last two decades were nor appropriate. This will be discussed in the following parts:

MANJIL EARTHQUAKE OF 1990

Before the Manjil earthquake due to the internal condition in Iran, less attention was paid to the problem of earthquake in order to improve the preparedness. In fact, Manjil earthquake occurred shortly after the war of Iraq against Iran and the necessary infrastructure for DM purposes in the country were not existed. Thus the coherent planning for disaster management was not developed and therefore operations in response were implemented using experiences gained in the times of the war. Based on the deficiency observed in that event, the responsibility for coordinating of relief and rescue affairs were given to the Minister to Interior in June 1990. Later in 1991 Disaster Management Taskforce was established. By the way due to lack of

organizational structure for disaster management and appropriate emergency operation center (EOC) at the time of Manjil Earthquake, some field bases were established in the affected cities to be used as field EOC's (Figure 1). However, these bases were not supplied with appropriate information and communication systems as well as initial action plans and the necessary infrastructures. This deficiency caused extra difficulties in management of response during the golden hours aftermath.

Figure 1. Establishment of disaster management command center in the vicinity of the earthquake affected areas in Manjil City after The Manjil Earthquake of 1990

BAM EARTHQUAKE OF 2003

The most important change in disaster management system of Iran before occurrence of the Bam Earthquake was approving the rescue and relief master plan in the Council of Ministers (March 2003). Although general approval of that plan made it executive but unfortunately, none of the guidelines and standards had been approved or developed before the Bam Earthquake. In addition, in that event again there was no emergency response command center equipped with necessary facilities and guidelines in the city that could be operational after the earthquake. In fact, various bases and many important buildings (such as Red Crescent Building, City Hall, etc.) were damaged or completely collapsed by the earthquake and thus using them as the commanding center was not possible (Figure 2).

Figure 2. Damages of municipality and Red Crescent buildings in Bam

After Bam earthquake many other deficiencies in emergency response measures were revealed in all governmental and non-governmental organizations involved in risk and crisis management, some as follows (Amini Hosseini et al., 2009):

- Lack of appropriate and comprehensive action plans and instructions in different phases of response;
- Inappropriate or inadequate organizational structure for emergency response management and operations without flexibility and based on individual decisions;
- Low readiness of relevant organizations;
- Insufficient information and unclear pictures about the roles and responsibilities of relevant organizations;

- Lack of coordination between responsible organizations;
- Friction or competition between organizations that were responsible for response (because unclear responsibility definitions or parallel structures);
- Lack of necessary information about the damage extent and potential casualties at the city and neighbouring villages.

EMERGENCY RESPONSE COMMAND CENTERS IN SOME COUNTRIES

Japan: In Japan, especially after the great Hanshin-Awaji earthquake (1995), the importance of integrated emergency response management were depicted more clearly to the officials, so development of EOC at different levels was considered as an important priority. For example, the disaster management center in Hyogo prefecture established in Kobe in 2000 with the aim to improve emergency response activities (Figure 3).

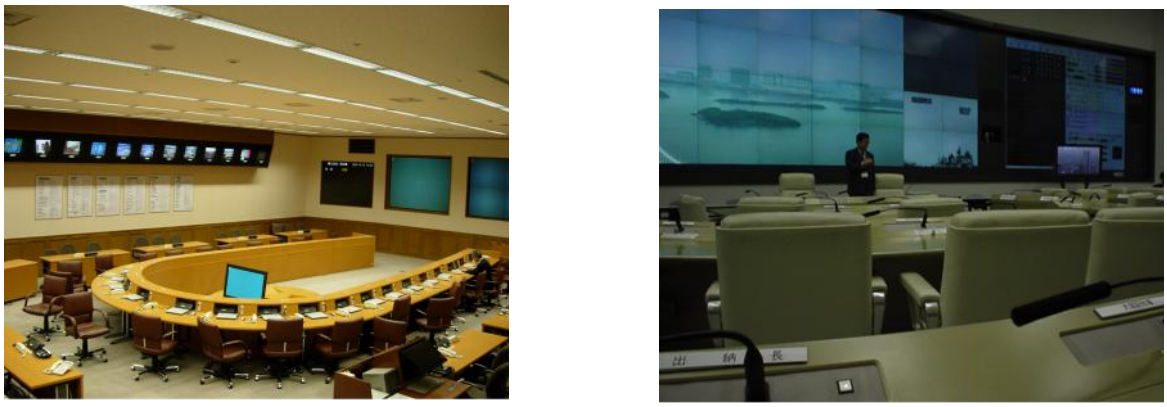

Figure 3. Examples of emergency response management centers in Japan; Right: Tokyo; Left: Kobe

The disaster management center of Japan at the national level was also established after Kobe Earthquake in Tokyo. Both the centers and similar centers in Japan have the following features:

- Safe buildings against earthquake;
- Proper location considering access and safety against earthquake;
- Connection with related centers and organizations to emergency response management, at local to regional levels;
- Having necessary networks, hardware and software stable against earthquake with the necessary information and databases on population and buildings;
- Having emergency electricity, water and communications networks so that they can work for 72 hours without interruption in crisis condition;
- Having storages of requirements for independent operation for at least 3 days;
- Assignment of the related forces for 24-hour 7 days operations.

The most important equipment (hardware and software) that are necessary to be used at the time of crisis available in these centers include:

- Special cameras for monitoring the city and transmitting information through reliable communication lines;
- Network communication systems for disasters and information disseminations (news agencies) systems;
- Professional software such as Phoenix Software with regard to integrated disaster management that has been designed in Kobe (Figure 4) and Ready Software in Yokohama city;
- Initial action plans as well as hierarchy in distribution of responsibility at the time of crisis after disaster.

Turkey: Emergency response management bases at different levels exist in Turkey. Disaster management centers at regional levels called AYM that are related to the central government and have held the following main tasks (Kuzucuoglu, 2006):

- Civil defence operations;
- Providing health and safety for survivors of disasters;
- Guidance and coordination of emergency response management when the disaster is beyond the city level;
- Promotion of education and culture of safety in disasters.

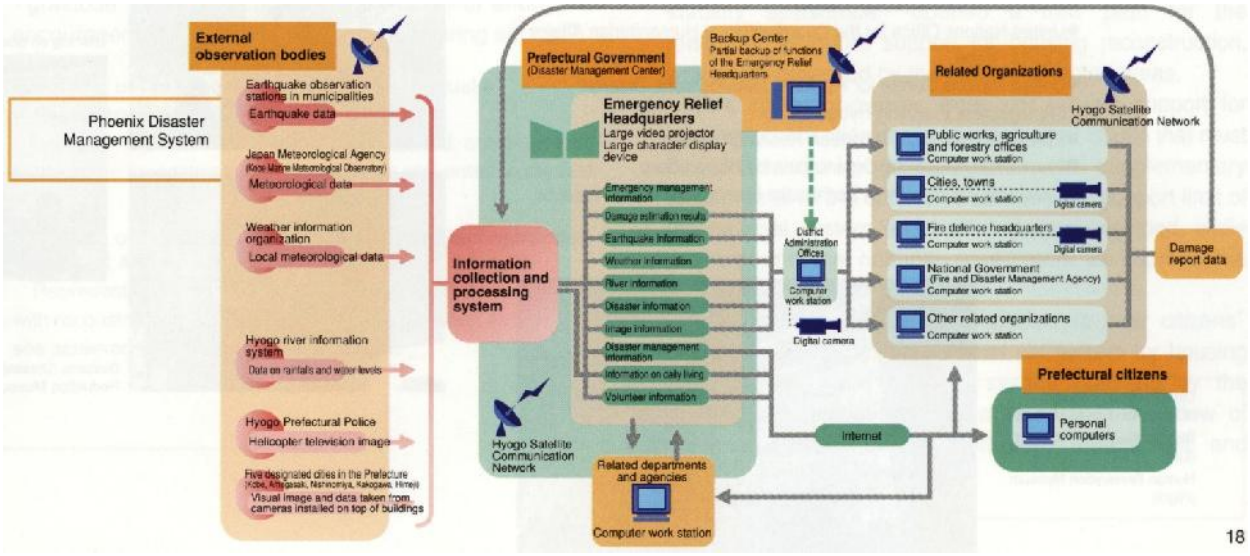

Figure 4. Diagram of different elements of the Phoenix system in Kobe (Phoenix, 2004)

In some cities in Turkey there are also some local EOC to provide necessary disaster management at local levels. For example in the city of Istanbul a disaster management center called AKOM is established (Figure 5).

Figure 5. Incident Management Center in Istanbul (AKOM)

This center, which is affiliated to the Istanbul Municipality was created after the earthquake of 1999 in Izmit and has the following responsibilities and duties:

- Organizing and coordinating activities related to risk and disaster management in Istanbul in order to minimize the effects of disasters;
- Monitoring and controlling activities of different organizations responsible for emergency response management;
- To organize search and rescue operations, training, and maintenance of equipment and supplies so that they are ready for emergency response;
- Planning for emergency communications and transportation;
- Preparing reports about activities;
- Monitoring of disasters that may create risk in Istanbul.

AKOM is also equipped with monitoring systems and advanced software for disaster management (Hazturk). This software has been developed by the University of Illinois (USA) in cooperation with Istanbul Technical University; financially supported by the Municipality of Istanbul. It may be considered as the Turkish version of MAEVIZ or HAZUS software. The program can be used before, during and after the earthquake and can estimate the damages and casualties caused by an earthquake.

India: Emergency response operations in that country in the past were run by the police and fire brigades when disasters occurred in cities, but the problems in coordination of the operations of organizations during the large disasters, created the idea of making a headquarter for emergency response in India.

Currently in India conducting emergency response operations are organized through the control room (or emergency room operations) located in the Ministry of Home Affairs that is active in 24-hour/seven days a week, to help the Central Relief Commissioner (NDMA, 2007). In the control room, the representative of civil defense organization, police, fire fighting organization, Ministry of Home Affairs, railway co. and the army and some other institutions are present. The main activities of control room include:

- Monitoring, collecting and sending information related to natural disasters;
- Monitoring and conducting rescue and relief;
- Coordinating of organizations for integrated actions at the time the disaster.

Control rooms in the state and national levels are equipped with emergency telecommunications systems and immediately after the earthquake or any other disasters they can be in touch with the damaged parts directly. The hot lines of communication are installed in these centers that provide a safe connection with 50 organizations related to emergency response management.

The United States: In the U. S. the EOC is located in the Office of Emergency Services. This room is equipped with advanced telecommunication systems and monitoring tools. Such rooms are existed in all different states and even most cities in the United States.

As an example emergency operations center located in the emergency management agency in Pennsylvania (PEMA) can be mentioned. Disaster room in this state is responsible for the coordination and conducting of taskforces relating to emergency response, planning for evacuation and emergency housing, and similar cases. The center also supports emergency operations centers at the level of cities and local governments at the time of occurrence of natural or manmade disasters.

Figure 6 shows how Pennsylvania Emergency Operation Center interacts with other centers and related organizations. In Figure 7 also presents a view of the emergency operations centers of one of the emergency operation centers in the United States.

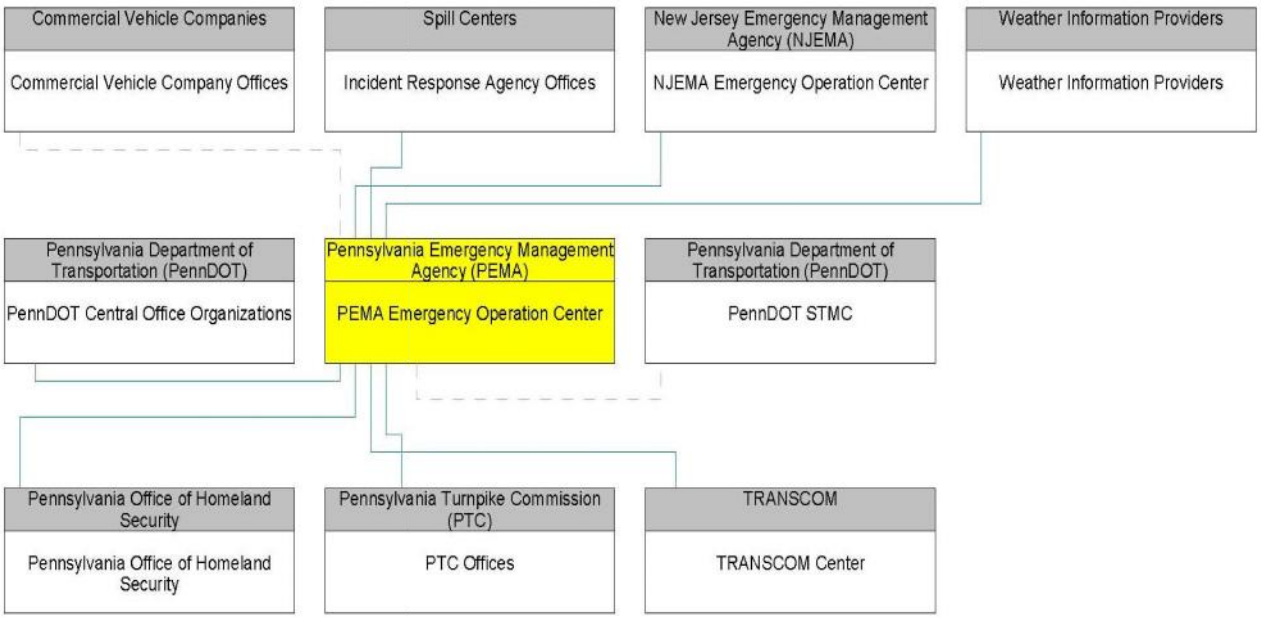

Figure 6. Interaction method of Emergency Operation Center in Pennsylvania with relevant institutions

Figure 7. A view of one of the Emergency Operation Centers in the United States

TEHRAN EMERGENCY OPERATION CENTER

Currently Iran has several emergency response command centers in all the provinces, but one of the most equipped and well-designed building is constructed in Tehran. This center has all needed facilities and infrastructures disused in the earlier pages (Figure 8). Of course the ministry of interior and many other big cities in Iran have some other plans for development such centers in different parts of the country as well.

Figure 8. Old and new EOC's in Tehran Disaster Mitigation and Management Organization (TDMMO)

The first command room in Tehran was built in 2004 in TDMMO for making necessary measures for disaster management. The center initially lacked features required for damage estimation and emergency telecommunications, but gradually necessary facilities were installed in the center. At the moment, the new building for this purpose is constructed and operational that has all necessary software and hardware required for emergency response management. This center is now equipped with cameras monitoring the city (traffic control), MPLS lines and telecommunications systems (satellite and ground communications), specialized applications such as quick damage and loss estimation system, monitoring systems (such as seismic network, and meteorology forecasting system) and other related systems needed for monitoring and emergency response operations. In addition the design of new building makes it safe to encounter any strong earthquake that may occur in or around the city.

CONCLUSION

Table (1) shows comparison between the situations of Iran with some other countries in emergency operation centers. As seen in this table, compared with developed countries and even many countries in the

region, except Tehran, the situation is not yet quite acceptable, which depicts the necessity for accelerating the development of necessary emergency response management centers and plans in whole the country.

Table 1. Comparison the situation of Iran with the some other countries in operation of emergency response management centers

Name of the Country	Emergency Response Command Centers	Secure emergency communications networks	Network for monitoring disasters	Action plans in command centers
Japan	✓	✓	✓	✓
Turkey	✓	✓	in Istanbul	in Istanbul
India	✓	✓	✓	✓
USA	✓	✓	✓	✓
Iran	Tehran and some main cities	relatively safe	Tehran only	Limited

For this purpose, the following strategies should be considered and followed:

- Developing emergency response command centers at national, provincial and even local levels;
- Preparing necessary guidelines and initial action plans for operation of these center before, during and after disasters;
- Empowerment of emergency response command centers using the new technologies for monitoring disasters and emergency operations;
- Providing prerequisite tools and infrastructures for starting and optimum utilization of these centers at various levels.

REFERENCES

Amini Hosseini K, Tasnimi AA, Ghaemghamian MR and Mohammadi M (2009) Local Disaster Management Assessment and Implementation Strategy, Earthquake Emergency Reconstruction Project, Loan Number: 4697-IRN, The World Bank

Kuzucuoglu AH (2006) Mitigation Strategy for Mega-Urban Earthquake Disaster, Istanbul Metropolitan Municipality, Earthquake Risk Management Department

National Disaster Management Authority, NDMA (2007) National Disaster Management Guidelines, Management of Earthquakes, Government of India

Phoenix Hyogo (2004) Creative reconstruction from the great Hanshin-Awaji Earthquake, Hyogo Prefecture, Kobe, Japan

World Health Organization, WHO (1986) Disaster Management Document number 14