

ZONING PLAN AND RESCUE OPERATIONS AND THE CITY RISK ASSESSMENT BASED ON GEOINFORMATION

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ABSTRACT:

At 1:26:26 GMT on 26 December 2003 an earthquake with a Richter magnitude 6.5, the green historic city of *Bam* in southeast *Iran* was razed, only in a few seconds.

Due to occurrence destructive earthquakes in *Iran*, prediction for crisis preparation and accidents resulting from normal and abnormal in *Iran* and rescue services accessible for all the people, zoning plan rescue operations and the of city risk assessment based on the geoinformation from the Iranian Red Crescent Society (IRCS) in collaboration with Khorasan branch of National Cartographic Center (NCC) were presented, and was accepted by Relief and Rescue Organization .

Project Objective:

- Timely and effective presence in accidents
- Preparation and increased ability to deal with crises caused by natural accidents and abnormal
- Access to all the people and rescue services as one of their social rights.
- respond to public expectations and sensitivity to receive and rescue services.

Project Stages:

First phase: Zoning Plan and rescues operations

The project aimed to determine zoning and safe areas and identify different areas of risk, determination of certain provinces to determine the specific city, city and distributed to certain provinces, field operations plan and map justification for any city.

1:2000 maps of cities in the project by the National Geodetic Survey for more than 600 countries have been supplying the city as a base has been using Geospatial Information.

Phase II: Design and Implementation of Geospatial Information System of Red Crescent Society (RCS-GIS)

Phase III: Crisis Management SDI

1. INTRODUCTION

The historic city of *Bam* in *Kerman* in south-eastern *Iran* was razed because of earthquake at 26 December 2003.

According to published reports, more than 80% of residential areas, government buildings, medical centers and the old citadel in 2500 were destroyed due to natural events and what remained was also useless. The world's oldest adobe city suddenly became piles of ruins and thousands lost their lives.

The quake in the early morning hours that most residents were asleep *Bam* happened that this issue can be escalated as one of the factors considered in loss of life. The official death toll of more than 25,000 people and injured about 50,000 people were declared. More than 100,000 people were displaced as well.

Such a natural occurrence in *Iran* because *Iran* is in the path of the Alps Mountains range, the Himalayas and one of the major earthquake zones world is the lack of safety regulations in the construction of these risks has increased exponentially.

The uncontrolled use of natural resources, forest degradation, invasion of privacy and the river bed and lack of commitment to environmental issues in many areas vulnerable to flooding also has.

2. TARGET IMPLEMENTATION

2.1 Organization Readiness

Predict destructive earthquakes in *Iran* for a long time in different cities on a common language. Although the occurrence time is not predictable, but there is no doubt that the occurrence is necessary and responsible organizations are ready to experience obtained in spite of the *Bam* earthquake, *Zarand* and *Baladeh* still awaiting the next disaster not been.

2.2 Capacity building for crisis preparation

to achieve a safe community in the face of natural events and disasters, capacity building for crisis preparation and accidents resulting from normal and abnormal in *Iran* and access to all the people and rescue services as one of the social rights Citizens can ensure that parts of the country's outlook is developing.

2.3 Expectations of public sensitivity

Expectations of public sensitivity and rescue services to receive based on experiences obtained from the *Bam* and *Roudbar* earthquake as part of welfare and social security services in the country has increased.

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3. ESSENTIAL PROJECT

While daily hundreds of files and structures on the surface with the help of a surveyor and equipment by satellite and aircraft are prepared and submitted, you can imagine a simple picture of a person may not place his life. The human condition that always at risk from accidents or natural is handmade, everyone has been proven that increasing public awareness and consciousness of people and prepares people and employee organizations to prevent and tackle is the most effective way of implementing.

Bam earthquake in 2003, the city in the country was rare events led to the accidents to be seen as new.

The earthquake had lessons in all areas and it turned out that the zoning of cities such as Bam after the fourth day of discussions were needed urban management and accidents.

Iran with specific geographical location, has 2000 points in urban. Rural areas due to population size, cultural characteristics and other factors affect when accidents are not controllable. But in an urban area the size of population and area of several villages there. Very important and significant places such as hospitals, power plants, water tanks and ... Are located in cities. Lack of zoning decisions in cities, functional forces in the first moments of entering the relief would confuse. National Cartographic Center (as part of Operation counter) with the aim of familiarity with maps and spatial data, identify areas of geography and ability to draw various locations including a residential unit or a village, a region or a country and taking over for the run Operation of the unknown time, place, intensity and surprise of the profile of the major bottlenecks and work is a realistic implementation plan be provided.

4. CURRENT ASSUMPTIONS

Despite scientific advances and the growth of human moment of modern technology, man managed to avoid accidents and natural disasters are not, but to reduce their effects and partly to do and prevention efforts but also to success are attained.

Operational areas may be geographic and geometric shapes that have different enough knowledge of them prior to training and exercises designed by the people depend on this knowledge may be obtained from the different ways that we need this project to study and research on cities Iran announced the intended priority.

Hypothesis of this research in all cities (in case of disaster) is inevitable but may in some cities, and perhaps more acute as the primary factor for more severe accidents is next.

For example, all or most of the following assumptions may arise in an accident:

- ✓ One or more cities and regions around the effects of natural disasters (floods, earthquakes, storms, heavy snow and ...) crisis was regional and transnational, causing the loss of missing and some damage to many buildings People and property should be.
- ✓ Lines, water supply, electricity supply, gas and telecommunications are destroyed.
- ✓ Hospitals, health centers, municipalities, fire fighting, service centers, petrol stations, bakeries and destruction ... and do not have the possibility of providing service.
- ✓ Ways on destruction and loss, displacement of soil and rock debris is blocked.
- ✓ Regional radio communications, including wireless and wire to be disconnected.
- ✓ Disaster officials in the early hours of depth data are not accidents.
- ✓ Machinery and tools for and rescue the critical and decisive moment's altogether.

- ✓ Unnecessary traffic and influx of people from cities around the cause and incidence of blocked traffic on area roads will be.
- ✓ Plan to ease traffic on certain traffic and road axes and there is no street.
- ✓ To control entry and exit routes and the city is not planning bottleneck.
- ✓ To collect and maintain the property and left is not planning.
- ✓ People lost their property and family are extremely concerned.
- ✓ Water, electricity and enough fuel in different parts of the region prior to use in times of crisis is not predicted.
- ✓ Relief and saving lives damaged and injured in the incident is not easily done.
- ✓ Places of treatment and treatment of eye injuries and damage is already specified.
- ✓ For the establishment of domestic and foreign aid workers camp location is not specified.
- ✓ Between the relevant category for guidance, control and supervision of foreign rescue and relief teams there is no coordination.
- ✓

5. PROJECT STAGES

5.1 First phase: Zoning Plan and rescues operations

The project aimed to determine zoning and safe areas and identify different areas of risk, determination of certain provinces to determine the specific city, city and distributed to certain provinces, field operations plan Varayh Map justification for any City 1:2000 maps of cities in the project by the National Geodetic Survey for more than 600 countries have been supplying the city as a base has been using Geospatial Information.

In this paper, the results of implementing the first phase of the project that completed, is evaluated and the geo spatial Information for other phase is reviewed.

5.2 Phase II: Design and Implementation of Geospatial Information System of Red Crescent Society (RCS-GIS)

The project aimed to implement GIS System Relief Organization of the Islamic Republic of Iran Red Crescent Society, one of the major parts of major infrastructure projects and perhaps a comprehensive management and rescue system will be offered in three stages:

- ✓ First stage: This stage of the core system and the main bed are other steps, including steps to identify and needs assessment, database design and implementation, compiling and organizing spatial data and descriptive information such as databases relief centers, warehouses, and ... , creating a GIS system and search and rescue organization and analyze the data and reporting relief organization based on the base maps country.
 - ✓ Second stage: After preparing the information and create an appropriate information system by creating GIS, data entry of population and housing statistics such as population centers and infrastructure facilities Badyhay country and their system and statistical studies related to seismology, the use of geological and mining maps of earthquake magnitude relations based on the Richter earthquake with a radius of structural damage and injury rate, the analysis of complex systems can be implemented.
- For example, upon receiving information from the center of Geophysics and entering the system (the third stage can be done automatically), to estimate the system status and population

centers of the affected villages and provide a list of facilities and equipment needs of the region Based on standards developed by the Red Crescent Society of warehouse operations managers offers.

This stage can be under earthquake relief management sectors (urban and rural) and other disaster relief management, such as floods and ... Be separated.

✓Third stage: a comprehensive contact management system to aid system core GIS data can be in the third stage of the plan predicted. This step involves creating a hardware infrastructure was fortunately given special look at the implementation of the relevant authorities in the implementation of crisis management systems has been done to some extent.

Contact Geophysics Center, crisis management headquarters and other centers in the country related to the use of organs in case of specific capabilities and capacities of their relief supplies, distribution facilities, planning is done. And finally, rapid communication system (SWITCHING) different levels of managers operating through mobile phones or can be summoned.

5.3 Phase III: Crisis Management SDI

Using SDI in order to avoid duplication and increase productivity of investments made in order to achieve sustainable development goals in society is necessary.

Crisis management SDI as sustainable mechanism for crisis management and spatial data connection to be viewed together. Crisis Management for the continuous need to achieve their needs and have immediate access to spatial information, which, SDI can be beneficial as a platform for empowerment help to solve the above problems can provide.

According to the above and applying the abilities and purpose underlying cause of admission to facilitate cooperation and information exchange in the Crisis Management System SDI example in Khorasan Razavi province under National Cartographic Center – Khorasan Branch is being implemented.

6. RECORDS RELATING TO PROJECT

6.1 Currently the country's cities by the municipalities, education and other devices are zoning.

6.2 The zoning coordination with other agencies and executive agencies do not each device needs to consider the executive said.

6.3 in 1999 ,Tehran with a comprehensive crisis management plan prepared by the municipality of Tehran, various measures for prevention and reduction and response and reconstruction has been done.

Coordination Council consists of crisis management experts have carried out plans, programs for developing the strategic plan has been prepared, the Secretariat consists of design and preparation phase is done after one year, the plan in the eighth session of the National Committee reduce the effects of natural disasters is approved.(Prevention and crisis management center reported in Tehran.)

Khorasan province in 2004 offering "zoning plan cities and rescue operations," the plan by the executive, administrative and educational measures, including educational workshops for branch managers and relief officials, preparation and preparation of relevant guidelines required maps for cities and towns took Torbat, Kashmar, Ferdows, Sabzevar, bajestan, Bshrvyh, Rshthkvar Ajrashdh plan is preliminary stages. Shhrastan also reported in three general and governor approved

the necessity of doing it as a city chief of staff accidents reached.

6.4 General and the need to plan has adopted the following references:

- Group work and rescue Khorasan
- Staff unexpected accidents Khorasan
- Coordination Committee and rescue Coordination Council of Social Welfare and Khorasan Province
- Committee of Welfare and Social Security experts Khorasan
- Coordination Council of Social Welfare and Director General of Khorasan Province

7. BASIC CONCEPTS IN THE PLAN

✓ The area that hanging over the city areas (any city within range of legal and privacy and privacy and shielding, and is divided into regions.)

✓ Population density (population per unit area than in different areas of each city)

✓ Type structures (structures in various tissues is different from the old and new cities of adobe to niches and resistant structures)

✓ Common cultural (each section of the city residents may commons ethnic, religious, cultural... have the same or different.)

✓ Effects of natural (mountains, rivers and the River, that may exist within the city)

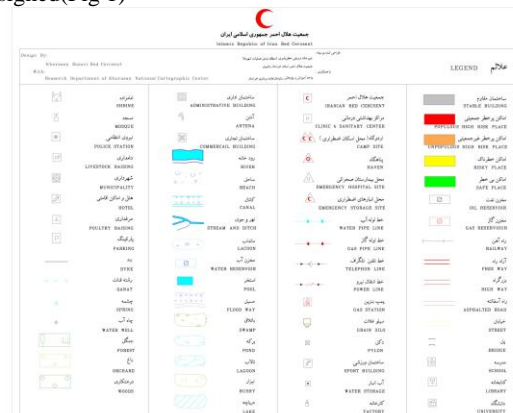
✓ Access routes (roads and out of town and usually limited to less than 5 way)

✓ Potential risks recorded in each region (in addition to the general potential of cities to earthquakes, for other events such as fires, floods, explosions, and ... may also be susceptible.)

8. DESCRIPTION IMPLEMENTED

Each point of the city based on area, population and other factors it is divided into several regions.

In this scheme, the standard Legendre and rescue purposes is designed(Fig 1)



Map as a particularly important source of information on the location and rescue and crisis management have therefore familiar with the generalities expensive relief maps seem necessary:

- ✓ Allow proper planning and rescue According to the position effects

- ✓ Familiar with the necessity of expensive regional disaster relief
- ✓ Identify lines and network utilities such as water, electricity, gas and telecommunications
- ✓ Different identification of risk areas such as population, offices, petrol stations and ...
- ✓ Identify service centers such as hospitals, health centers, fire, police and ...
- ✓ Identify Communication ways
- ✓ Identify communication centers such as wire and radio communication facilities of wireless and mobile offshore ...
- ✓ Identify stocks, the grain silo and ...

Information about each region, respects her own green areas, and important places. . . Listed on the map and other necessary information in the map margin is written for each area. For example, in green areas should predict at least the following facilities, the location and design of a possible mobilization are: Camp, which already designed for this purpose or created.

Open land and no installations or structures for the camp is good.

Urban parks and green space suitable for the camp are making. Campus organizations and administrative relief camps have been making good.

Indoor sports halls (niches), and public storage.

Office buildings, schools, mosques and ... If the strength.

Colors can be given the contract to range are placed in one incident rates rise in the region and it won high-risk areas:

- ✓ Red: Severe Risk area
- ✓ Yellow: Medium risk area
- ✓ Gray: Low Risk
- ✓ Green: Safety area

In the following figures some examples of these maps is shown



9. CONCLUSION

- ✓ Led to this project maps for relief and rescue operations in the cities will be selected and will prevent problems such as Bam.
- ✓ Large formal and colloquial names of roads, boulevard, street and alleys will insert.
- ✓ Range of services, legal, privacy and shielding city detectable limits and, if necessary, and were separated in each city land suitable for construction camps will be marked on the map.
- ✓ Large residential complexes will be identified and significant.
- ✓ Highway, boulevard, Main Street and alleys clearly visible route highways, roads, railway crossing and any input or output city will be displayed.
- ✓ Tunnels and bridges on the possible main and secondary axes leading to the city with distances on the map above will be inserted. (For each bridge or tunnel project will be prepared to deal.) Rivers and other natural negative effects recorded on the map and the mountains, hills and other natural positive effects on Earth and also recorded on the map will be visible.
- ✓ The main transmission lines and water main route networks, electricity, gas and control centers and their determination will be visible on the map.
- ✓ Dams, power plants, refineries, major industrial units, large storage tanks of fuel and chemicals, and similar cases, even if outside the city limits also have been mentioned on the map to be recorded was the distance. (For each dam, power plant Branch, Industrial.. Due to the type and severity of risks and opportunities and threats that confront plan is prepared.)
- ✓ Storage centers, and oil and chemical storage, flammable goods storage warehouses, gas stations and control centers to fuel supply risks and also set up priority, were identified and recorded, and the gas station addition to having to deal Operations Plan, Operational Plan Accountability and the fuel supply after the incident will be prepared.
- ✓ Hospitals, relief centers, and medical clinics, police centers, airports, railway stations, offices, organizations, executive agencies and cooperating and supporting operations ... Been identified and recorded for each organization and internal operations plan will be prepared and practiced.
- ✓ Four directions of each region (North, South, East and West), wind direction, according to people living in households and people of each region. Number of residential units each region separately and mud brick, brick and iron surface area per hectare area, roads Access to the town and other general information and requirements will be recorded on the map.