



## The Study of the Crisis Management Role in Civil Projects (The Crisis Management of Land Subsidence in the Special Economical-Petrochemical Zone of MAHSHAHR)

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**Abstract.** Unforeseen events have a great role in causing personal and financial losses each year around the world. Nowadays, one of the important problems in maintaining human and material resources and countries development is the natural or unnatural disasters that the correct management weaknesses in order to control and deal with them, lead to an increase in the amplitude and the range of damages caused by the crisis. Due to the large number of running civil projects in Iran and the high number of accidents in these projects, paying special attention to the planning and crisis management in construction projects come to importance more than ever. The purpose of crisis management is to regulate and coordinate the integrated measures of responses and reactions toward crisis in order to prevent or minimize the risk, if it is possible and rapid and effective reaction if it is not possible to prevent the catastrophic event, and help to normalize the situation, as soon as possible. Therefore, firstly, in this paper, it has been investigated the main common weaknesses indifferent patterns of crisis management and accordingly, the special questionnaire of land subsidence of Mahshahr petrochemical zone was designed and it was distributed among the statistical society of officials, managers and specialists of the different regionals and by the analysis of the responses, this result conducted that the effects of land subsidence crisis have 40- to 60% impacts on the civil projects in terms of time, cost, timetable schedule delays, etc., that it is recommended that the problems should be solved by establishing crisis management in civil projects of all parties.

**Keywords:** Crisis Management, Land Subsidence, Mahshahr Petrochemical, Special Zone

### 1. INTRODUCTION

According to the international strategic plan of the UN natural disasters reduction, all dangers have two main sources: the natural dangers and the risks related to technology (risks caused by human activity) (Moe, Tun Lin. Pathranakul, Pairote, 2006). Human beings have been continually try and rush to achieve a risk-free environment and to have preparation for possible events caused by disasters in order to protect their life, property and family (Taghvaie M. and Karimi H. 2012). Hence, due to the unexpected nature of disasters, particularly natural disasters and the need to make quick and correct decisions and the implementation of operation at the moment of disaster, and fundamental and theoretical principles, creates a knowledge as crisis management (Ghanavati A. Ghalami SH. And Abdoli A. 2010), crisis management, is an integrated system which is based by the use of science, technology, programming, management in order to deal with incidents which killed a number of human, caused destruction or general damages to the property of people and social life disturbance. Crisis management system by its different stages predicted the amount of damages caused by the occurrence, evaluated the potential they have got to create further damages, and investigated the existing facilities in order to deal with them, equipped all executive and planning power for applying its facilities.

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In today's world, natural, technological, political disasters, threatens countless societies, so that they will have to learn the skills to cope with the disaster (Mapar M. Et al., 2008).

### **CRISIS**

The presence of serious discipline in the operation of a society which includes extensive damages and widespread impacts of personal, financial, economic or environmental which is beyond the ability of effected society to adapt and cope with the use of resources in order to be available for themselves (ISDR. 2009).

### **THE CRISIS RISK MANAGEMENT**

Systematic process of using of administrative arrangements and guidelines, organizations and implementing skills for operating the strategies, politics, and the improved consistent capacity in order to minimize and reduce the acute and incompatible effects of risks and the crisis probability. Crisis risk management aims to prevent from the acute and incompatible impacts of risks, through the activities and couple of thoughts for preventing and reducing the effects and preparation, decreasing or transmitting them (IS DR. 2009).

### **THE GENERAL WEAKNESS OF THE CRISIS MANAGEMENT PATTERN**

Various organizations due to the experience that they have got in crisis management and also the type of events that threaten them and the greatness of the organization and their available resources, they are used from different patterns in order to deal with such crisis in crisis management systems. However, it can be seen significant differences in the structure of crisis management indifferent organizations but the duties of related units are approximately the same everywhere, the type of crisis management model in any way that it would be, the main purpose is to deal with disaster. the models which are provided until now had some flaws that impede the proper functioning of the organization during the critical reaction. The most common weaknesses in crisis management models are as follows (Mapar M. et al., 2008).

- A lack of a comprehensive policy in order to deal with all the crises that have always been involved with an organization
- Lack of the necessary coordination between the different parts of an organization in crisis conditions
- Lack of explaining of the personnel's performances in the crisis conditions
- Lack of establishing organization, orderliness, discipline and inter-organizational discipline in order to deal with crisis
- Lack of notification
- Refrain from responsibility
- Failure to identify and structure establishment for commanding at the time of incident
- Lack of proper collection and dissemination of information
- Lack of adequate or necessary coordination with institutions outside the organization
- Failure to regularly review and development of projects

### **THE CRISIS MANAGEMENT GOALS**

- At first, meeting the crisis and emergency conditions in projects

- Restoring the project to its normal mode quickly
- Reduce the impact of the crisis on the project and deal with it with the least cost
- Creating readiness in the project in order to deal with the crisis
- Reducing vulnerability arising from crisis in the project
- Reconstruction of the critical areas of project in any situations
- Providing practice and training in project in order to be prepare for dealing with the crisis

But today, we see in our country that they are paying more attention to the crisis aftermath measures like searching and rescuing and restructuring efforts, in comparing to the measures before the crisis like effects reduction and preparedness, and such an issue cause to an increase in the loss rate of life and property which are conducted during the variety disasters in the country (Soheyli poor M. and Montazerolhaje M. 2012)

According to the above, the complete strategy that can be considered at different levels of disasters and crisis against dangers and its effects reduction, is named crisis management cycle which can be seen in Figure 1 (Ganjei S. 2012).

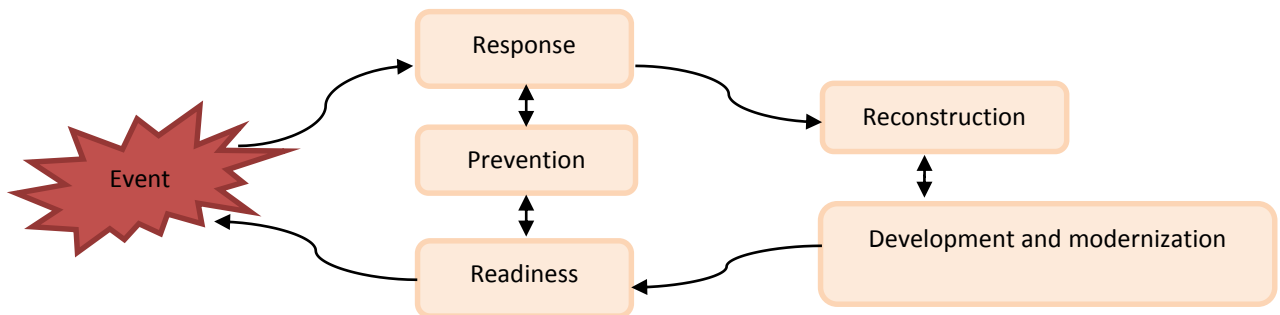


Figure 1. Crisis and disaster management chart (5).

## INTRODUCTION TO THE SPECIAL PETROCHEMICAL-ECONOMICAL ZONE OF MAHSHAHR

Certainly, the special petrochemical-economic zone of Mahshahr, of which about 17 years past from its industry ages, nowadays it has a special occasion in the country's oil and petrochemical industry development as a strategic center in petrochemical adulterous production and export. Activity and the progress of the work of units and manufacturing buildings which are in the special petrochemical-economic zone of Mahshahr, indicates a clear future in the changing of this important industry and development of the infrastructure economy of the surrounding environment and many other provinces of the country.

Special petrochemical-economic zone of Mahshahr with 2600thousand hectares, 13 Km length and 2 km width, has begun the construction and installation work. In the North West side of the area, the Imam Khomeyni port (BIK)is placed and this area is close to Mahshahr from east. This area has all the communication ways that a group can have, such as the airways, railroads and roads and waterways, which leads to the high seas. Special petrochemical-economic zone of Mahshahr has 5 sites which is including of the site number one which is for light and downstream petrochemical industries which is belong to the private section, the site number 2 which is for heavy and mid-heavy industries and, the site number three, the company of Arv and ghadir and technologists and research and technology of verehavaran and environment and emergency and

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fire-fighter and protecting of the regional senior, site number four belongs to the five governmental company and one private company in order for recycling industrial waste, site number five which is the largest and the oldest companies of region and Mousa's bowl that are located as one of the best bowls in Iran, (Petrochemical Industry National Company. 2013).

### RESEARCH METHODOLOGY

Due to the topic of this research which is the study of crisis management caused by land subsidence in the civil projects of the special economic-petrochemical zone of Mahshahr, a questionnaire is designed in order to investigate the proper ways of crisis management in this zone that we are going to talk about it in following.

#### Questionnaire design

In order to study the effects of land subsidence crisis in the projects of this area and providing appropriate solutions to the manage crisis, one of the best methods of research in this mode is conducting field research and study from practitioners, experts, managers and others who are participated in the Mahshahr's special petrochemical-economic zone projects. Accordingly, a specific questionnaire was designed by the researcher and distributed among 100 individuals of above participants, questionnaires were distributed among 25 experts, officials and employers, 25 consultants, 25 contractors and beneficiaries. Also, in the distribution of questionnaire, it was trying to be relatively coherent distribution among the total project of this area, in the distribution of questionnaires. And then research questions were investigated by using of frequency tables and quantitative and descriptive statistics. According to the crisis management models, in the designing of these questionnaires, they were trying to study the following factors.

- Effects of the land subsidence crisis on projects
- Effective measures in the preventive step of crisis
- Effective measures to deal with the crisis
- Effective measures to restore and subjugate the effects of the crisis

In the designing of these questions, they were trying to investigate the important factors and measures in order to manage the land subsidence crisis, both in a qualitative and quantitative way.

### THE RESULTS

The results which obtained from this field research are statistically provided in the following:

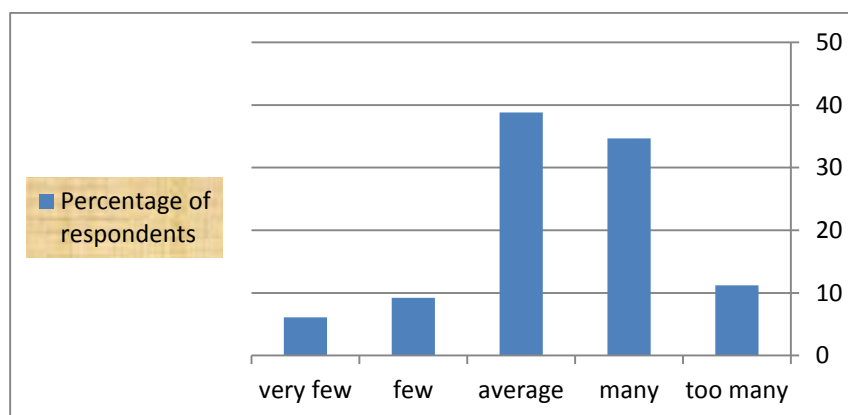
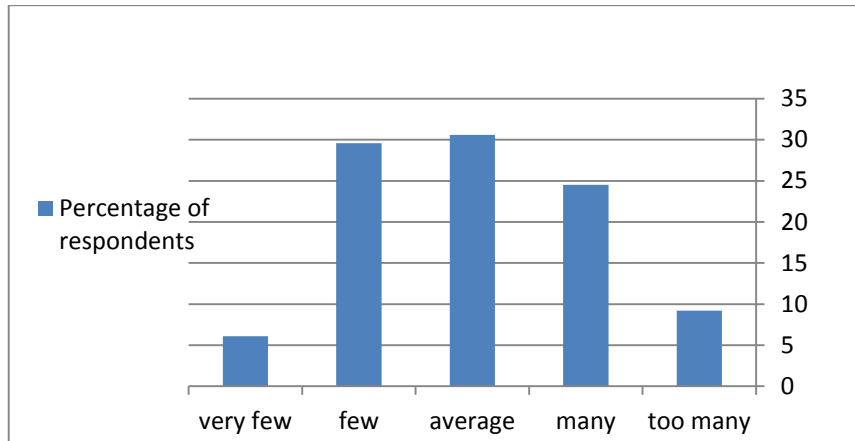


Figure 1. Percentage of respondents.

As it seen in Figure 1, the highest frequency is related to the average response, so that 38.8% of respondents answered that the average of the special economic-petrochemical zone of Mahshahr projects have been involved with the crisis caused by the land settlement.



**Figure 2.** Percentage of respondents.

According to Figure 2, the most frequent percentage are related to the average responses with 30.6. So that people believe the project which were involved in crisis subsidence, average of them have delayed from timetable schedule. Also, the 6.1 percent of respondents who were involved in crisis settlement project have delayed so many times.

Similarly, by comparing the observed responses and subsequent figures (we did not bring all those figures because there were some any of them.) You can reach the following conclusions:

38.8% of individuals believe that the presented projects in the special economic-petrochemical zone of Mahshahr were averagely involved in the crisis problem caused by land subsidence.

30.6% of individuals believe that those projects which were involved in crisis subsidence had been delayed from the timetable schedule.

34% of people believe that in the project of the land subsidence crisis problem, the cost amount of the project was largely increased in comparing to the original estimated cost.

35.4% of people believe that in the crisis problem projects, the design and basic structures of the original project, has changed a little at runtime.

19.8 percent of respondents believe that land subsidence has caused a small amount of problems toward projects' main structures and equipment operation or the flow of products and services.

32.6% of respondents believe that the land settlement crisis has largely affected the lack of accessibility to the basic objectives of the project or efficiency reduction of operation of the project.

16.3% of respondents believe a sufficient and appropriate to the initial designs and technical specifications for the improvement operation implementation by the contractor to carry out a project.

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28.6% of individuals believe that the monitoring carried out by the consultant on the correct implementation of improvement operations are adequate and appropriate.

37.1% of respondents believe that the land subsidence crisis, despite conducting the studies and implementation of the improvement appropriate methods are caused a little by non-unknown, predictable factors.

43.8% of individuals, using candles with more counts and total length in the underlying heavy structures, are largely effective on crisis of land subsidence in the special economic zone of Mahshahr.

41.2% of respondents believe that the use of new methods inland improvement and increase its resistance, have been largely effective toward land subsidence crisis in Special Economic Zone of Mahshahr.

21.6% of individuals believe that the widespread use of rigid and extensive foundations in the underlying heavy structures have been largely effective toward the crisis of land subsidence in the Special Economic Zone of Mahshahr.

11.2% of individuals believe that, the increase of productivity and production of the most projects with good management practices has been largely effective toward the offset of the section.

### SUMMARIZATION OF RESULTS

According to the topic of this research and the designed questionnaire and the investigation of field study, we studied the land subsidence crisis and crisis management strategies in this area, which respondents divided into 5 groups of (Diploma, Advanced Diploma, Bachelor, Master and PhD and higher), figure1 shows the respondents frequency in terms of education in the above represented groups. According to Table 1, most of frequency were related to the bachelor group with 66.7% and the minimum of frequency was related to the doctoral and higher groups with 0 percent.

**Table 1.** Status of respondents in Education.

	Abundance	Frequency
Diploma	4	4.0
Technician	9	9.1
License(BA)	66	66.7
MA	20	20.2
PHD and higher	0	0
Total	99	100

By analyzing the responses, this result achieved that the effect of land subsidence crisis has impact on the 40 to 60 percent of the civil projects in terms of time, cost, timetable schedule delays, etc., which is recommended to deal with this by establishing the crisis management in civil projects of all groups and mobilizing the facilities and training and continually updating methods to solve the problems according to the proposed four stages in research. Due to the presented factors, it is necessary to be investigated before the design, manufacturing and installation of the units, so on and appropriate measures must be taken up in order not to be suffered from irreparable harm after the operation of these units. The extended time cost of the levels of design and studies before it,

if it leads to good decisions, will be well compensated by the benefit from those decisions in the next levels. Obviously, if the construction project managers believe crisis management as an integral part of their strategic responsibilities that the possibility which their projects involved the crisis are likely to be reduced. Paying attention to the crisis management and its relation to technical and operational planning is very important. In the last analysis, the crisis management is a long-term survival and the guarantee of the project. The four-step proposed approach in this study will help managers to develop their decision-making skills and understanding the crisis management role and significance in the process of civil projects strategic management.

In our country also, despite the introduction of crisis management issue and theory discussions, no same project has been done in this field. So this research could be a starting point for further research in the field of crisis management to address practical issues.

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