RESEARCH ARTICLE

REVIEW EXISTING STRATEGIES IN CRISIS MANAGEMENT OF CONSTRUCTION PROJECTS FOR OPTIMUM USE OF CONSTRUCTION MACHINERIES (CASE STUDY LORESTAN PROVINCE, IRAN).

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Manuscript Info	*Abstract*

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It is past more than forty years from entering heavy construction and mining machineries to cycle of activity and construction in Iran and always was given special attention to these machineries as a commodity asset in organizations. Output of machineries was depend on different factors such as type and building machinery, physical conditions, operators, complete management and coordination between all factors; whereas each machine during its life time is repaired partially or wholly and all its cost is depend on some factors such as delivery of machineries, work difficulty, number of hours of operation per year, annual useful life of machine, operator skill level of each machine, proper maintenance and timely repair it and market conditions of second hand machinery at time of sale, they are eventually placed in a position that machine owner should choose one of two options of scrape or rebuilt for costs optimal management. This study is descriptive and functionality which considered effective factors in machinery decision making to rebuild product and rate of success in each dimension's decision. In order to identifying and ranking factors, Delfi method and inferential statistical techniques for evaluation existence gap with optimal condition in each aspect were used and designed a questioner with 18 questions and 7 aspects and polled of expertise and finally means of reducing the gap was discussed.

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Introduction: -
Issue of crisis management has been considered by organizations and governments. Crisis is event or unexpected incident that natural, technical or social factor made it and some results has produced such destruction, loss or death (Perry et al., 2004). With more numbers and complexity of crisis and hazardous, preparedness for deal with it in crisis management circle had more attention and governments try to reduce these disasters by necessary actions. So known way of planning and readiness in crisis management in form of crisis management designing was in attention. Administrators are trying to preventive measures to reduce human and financial loss (Alexander et al., 2002). Crisis management of planning and organizing forces and facilities is for reducing or minimizing human and financial losses before, during and after crisis. Objective of crisis management is reducing consumer costs caused by crisis on one hand and reducing negative effect of crisis on economic, security, social and cultural rights on the other

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hand. Crisis Management is scientific and functionality and is based on observation and analysis of crisis in searching for new tools and principles of planning, organization, leadership and control (Momeni, 1389). According to existing strategies of crisis management in construction projects in order to more efficient use of construction machineries made focus on construction machineries, construction machineries has very important role in implementation of construction projects, and today almost any construction project is applicable without use of machineries. Using machinery in construction projects lies because of proper implementation and progress of work at high speed with low cost. Meanwhile today by use of machineries can be implemented large projects in short time which before was not possible. So, trends in projects would go toward use of machineries in executive operation. Development of city, urbanization and gradual rise of large cities in the world especially in developing countries as Iran from one hand and urban growth, focus and concentration population and increasing environmental and economical loadings on their bed on the other hand, different roles and functions accepted in spite of more attention to cities. Every year in Iran natural disasters left a lot of human and financial losses. Iran's devastating disasters are unfortunately being so severe that based on latest statistics, at least thirty-one of forty well-known type of disaster is common in Iran. Climatic variations and different and diverse natural conditions and also noncompliance with scientific standards in buildings and culture poverty in face of crisis especially natural disaster made Iran as one of the world's most vulnerable countries. Also to minimize effects of natural disasters, growth and promotion of crisis management is required because correct management on crisis will reduce effects of crisis in controlling damage and human losses.

Statistic populations: -
In thisstudy statistic population is consisted ofall employees ofRed Crescent, Boroujerd Army. Accordingto do survey, and obtained information fromprovincial educationandmanpowerofother organizations are about2,000 people.

Evaluation sample size: -
Inthis study due to extension of statistic population andlack ofavailability of allpeople,400 ones werepurposefullyselectedandquestionnaireswered istributed. This distribution isshown in Table1.

Table 1: - Distribution of sample people.

Specifications	Number (people)
Army	250
Red Crescent	150

Data collectiontools:-
In this study, main tools of data collection are Jahromycrisis managementstandardquestionnaire(2002) that distribution of questionnaireareasTable 2.

Table 2: - distribution of questions of crisis management questionnaire.

Component	Question no.
Structure designing	1 to 4
Recognition	5 to 7
Complexity	8 to 10
Concentration	11 to 15
Need assessments in crisis management activities	16 to 35

Also validity and reliability of this questionnaire confirmed by other researches (Jahromi, 2002), and in this study for validation of questionnaire, 30 questionnaires distributed for test and Cronbach's alpha amount was 0.89 which was valid.

Hypotheses: -
1. Do benchmarking of best practices is in setting up projects and machineries management.
2. What are merits of strategic management in construction projects?
3. Whether impact of strategic management on function and selection in machinery management help.
4. Are decisions and integrated activities for developing of effective strategies, implementation and control of their results.
5. Whether correct management and programming in use of machineries in a project would deliver us to our goals.

Descriptive statistics: -
Education of respondents: -
As you can see in below table, super diploma, BA allocated most frequency (each one 145 people) 73% and M.Sc. with lowest frequency (110 people) around 27.5% of respondents.

Table 3: - frequency distribution and education percent of respondents to questionnaire

Education	Frequency	Frequency %	Total %
Super diploma	145	36.3	36.3
BA	145	36.3	72.5
M.Sc. and higher	110	27.5	100
Total	400	100	

Work experience of respondents: -
Referring table 4, 10-15 years' experience is most frequency (168 people) near 42% and more than 20 years' experience with 7 people (approximate 1.8%) is lowest frequency of respondents.

Table 4: - frequency distribution and work experience percent of respondents to questionnaire

Work experience	Frequency	Frequency %	Total %
5-10	135	33.8	33.8
15-10	168	42	75.8
25-20	90	22.5	98.3
More than 20	7	1.8	100
Total	400	100	

Considering and checking research hypothesis: -
Referring normal distribution of statistic data parametric statistical tests is used for data analysis. In this study we use independent T-test to analysis each hypothesis. For big samples parameter tests are used even society is non-normal. But statisticians have different view how sample should be big. If variable was not unnatural, parameter test can be applied for 30 samples or more just difference between these two test include that non parameter test can distinguish less. So two type of test can be applied for big samples (Jandaghi, 2005).

Referring above explanation we evaluate hypothesis by T-test for two independent group in this part.
First hypothesis:
H_0: there is no significant relation between structure designing and earthquake crisis management in organizations.
H_1: there is significant relation between structure designing and earthquake crisis management in organizations.

$$\begin{cases} H_0: \ \rho = 0 \\ \\ H_1: \ \rho \neq 0 \end{cases}$$

Table 5:- Pearson corelation coeficient analysis – First Hypothesis.

Test result	Earthquake crisis management			Independent variable
$H_{1\ confirmation}$	Significant level	Error level	Calculated Pearson corelation coeficient	Structure designing
	0	0.05	0.759	

Under Pearson corelation coeficient analysis, if significant level was lower than error level (**α**) 0.5 then correlation is significant and H1 is confirmed.
So with confidence 95% can tell there is significant relation between structure designing and earthquake crisis management that this is shown in table 5. In other words, it can be concluded in research statistical society there is significant relation between structure designing and earthquake crisis management in organizations.

Second Hypothesis: -
H_0: there is no significant relation between recognition and earthquake crisis management in organizations
H_1: there is significant relation between recognition and earthquake crisis management in organizations

Significant of hypotheses are as follow:

$$\begin{cases} \mathbf{H_0}: \ \rho = 0 \\ \\ \mathbf{H_1}: \ \rho \neq 0 \end{cases}$$

Table 6:-Pearson corelation coeficient analysis – Second Hypothesis

Test result	Earthquake crisis management			Independent variable
$H_{1 \ confirmation}$	Significant level	Error level	Calculated Pearson corelation coeficient	Recognition
	0	0.05	0.633	

Under Pearson corelation coeficient analysis, if significant level was lower than error level **(α)** 0.5 then correlation is significant and H1 is confirmed.

So with confidence 95% can tell there is significant relation between recognition and earthquake crisis management that this is shown in table 6. In other words, it can be concluded in research statistical society there is significant relation between recognition and earthquake crisis management in organizations.

Third Hypothesis: -
H_0: there is no significant relation between complexity and earthquake crisis management in organizations
H_1: there is significant relation between complexity and earthquake crisis management in organizations

Significant of hypotheses are as follow: -

$$\begin{cases} \mathbf{H_0}: \ \rho = 0 \\ \\ \mathbf{H_1}: \ \rho \neq 0 \end{cases}$$

Table 7:- Pearson corelation coeficient analysis – Third Hypothesis.

Test result	Earthquake crisis management			Independent variable
$H_{1 \ confirmation}$	Significant level	Error level	Calculated Pearson corelation coeficient	complexity
	0	0.05	0.708	

Under Pearson corelation coeficient analysis, if significant level was lower than error level **(α)** 0.5 then correlation is significant and H1 is confirmed.

So with confidence 95% can tell there is significant relation between complexity and earthquake crisis management that this is shown in table 7. In other words, it can be concluded in research statistical society there is significant relation between complexity and earthquake crisis management in organizations.

Forth Hypothesis: -
H_0: there is no significant relation between concentration and earthquake crisis management in organizations
H_1: there is significant relation between concentration and earthquake crisis management in organizations

Significant of hypotheses are as follow: -

$$\begin{cases} \mathbf{H_0}: \ \rho = 0 \\ \\ \mathbf{H_1}: \ \rho \neq 0 \end{cases}$$

Table 8:- Pearson corelation coeficient analysis – Third Hypothesis

Test result	Earthquake crisis management			Independent variable
$H_{1 \ confirmation}$	Significant level	Error level	Calculated Pearson corelation coeficient	concentration
	0	0.01	0.736	

Under Pearson corelation coeficient analysis, if significant level was lower than error level (**α**) 0.5 then correlation is significant and H1 is confirmed.

So with confidence 95% can tell there is significant relation between concentration and earthquake crisis management that this is shown in table 8. In other words, it can be concluded in research statistical society there is significant relation between concentration and earthquake crisis management in organizations.

Fifth hypothesis: -
$H_{0:}$ There is no significant different between needs assessment of crisis management activities and governmental and nongovernmental organizations
H_1: There is significant different between needs assessment of crisis management activities and governmental and nongovernmental organizations

Significant of hypotheses are as follow: -
Table 9: - Test results of mean comparison.

Standard error	Criteria deviation	Mean	Number	Group
0.842	39.1	23.12	250	Governmental
0.742	0.74	44.11	150	Non-governmental

Mean equality of T-test							Lovin Test, Variances equality		
Confidence interval		differences Standard error	Differences mean	Significant level for means equality	Freedom degree	T	Significant level for variances equality	F	
High	Low								
74.1	0.526	0.580	0.759	0	249	89.13	0	55.21	Assuming variance equality
66.1	0.89	0.669	0.659	0	149	59.11	0		Assuming variance non-equality

Mean comparison test is used for analysis of fifth hypothesis.
If sig of Lovin test is equal to zero and smaller than 0.5% significant level, then hypothesis of variances equality rejected. Then we used information of second line to make result of mean.

Whereas significant level was smaller than **œ=0.05,** significant difference between raised means and intended mean is obvious that low and high signal should be considered. As these two signals are positive so mean difference of two societies is more than zero and mean of first society is more than second society.
Since obtained mean is located in H_1, by 95% confidence level can be said that H_1 research hypothesis is confirmed (sub hypotheses no.7). It means that there is significant different between needs assessment of crisis management activities and governmental and nongovernmental organizations

Conclusion: -
In H1 hypothesis, test result implies impact and verifies this hypothesis. Reason of this relationship can be pointed that organization structure has many effects in performance and speed of organizations response in crisis management because organization structure reflects placement of sections and how orders and operations is necessary in organization.

In the second hypothesis test results show that this hypothesis is confirmed. This means that by 95% confidence, in view of majority respondents, there is relation between recognition and earthquake crisis management in organizations.

Test results of third hypothesis show that this hypothesis is confirmed. This means that by 95% confidence, in view of majority respondents, there is relation between complexity and earthquake crisis management in organizations. Reason of this relationship can be pointed that organization structure has many effects in performance and speed of

organizations response in crisis management because according to definition of complexity, number of tasks or sub-systems is done within an organization or there are.

Test results of forth hypothesis show that this hypothesis is confirmed. This means that by 95% confidence, in view of majority respondents, there is relation between concentration and earthquake crisis management in organizations. Reason of this relationship can be pointed that organization structure has many effects in performance and speed of organizations response in crisis management because according to definition of complexity, there are levels of authorities which can decided.

Test results of forth hypothesis show that this hypothesis is confirmed. This means that by 95% confidence, in view of majority respondents, there is significant difference between needs of government and non-governmental organizations. Reasons can be mentioned that organization structure, mission and goals of governmental organizations is in a way that effectively and efficiently implementation of any necessary program of crisis management is not possible so nongovernmental organizations need more attention and provided necessary infrastructure for their cooperation. In addition, training students, families and all people is necessary.

Positive strategies of relevant organizations:-
1. Proper monitoring in education and use of specialized nongovernmental force for training.
2. Status for nongovernmental organizations before and after earthquake.
3. Special attention to level before earthquake, and it impact on crisis management continuation.
4. Regular crisis management meetings in Boroujerd.
5. Training of military forces, which have played an important role in crisis management.

References: -
1. AdibRamezani, M. Akbarpoor, (2014). Studying effective parameters on crisis management.
2. Azadehdel, Ramezanali, (2011); Implementing native crisis situation Room based on CISR organizational architecture framework,MalekAshtar university.
3. Amir Kabir, Alireza, "Strategic Management", Malek Publisher, 1999.
4. Ahanchi, M. (1376) disaster management: records, concepts, principles and theories, the first book, Red Crescent Society of the Islamic Republic of Iran, Training and Research Center in Tehran.
5. Article "Reviews recent advances in strategic management", translated by RasoulAkram, Semnan.
6. Brown, Ernest, 2001, field of technology (technology assessment for managers), translated by Mohammad Zanjani, Industrial Management Institute Publisher.
7. D. Alexander (2002). From civil defence to civil protection-and back again. Disaster Prevention and Management, vol. 11, no. 3, 209-213.
8. Deputy Planning and Strategic Supervision of President, Publication No. 446
9. GhafarianVafa and GholamrezaKiani, five commands for strategic thinking, Fara publisher, Second Edition, 2005.
10. Momeni, Saeid, lifeline gas management, teacher training course in crisis management, winter 2011.
11. R. W. Perry and E. L. Quarantelli (2004). What is a Disaster? More Perspectives. Philadelphia, Xlibris.
12. Strategic Supervision deputy, 2010.
13. Tajik, Mohammad Reza, (2000), Crisis Management: Critique of analysis methods of crisis management in Iran, Tehran, Culture of dialogue.