

Exploring the Situation of Crises Management in the Egyptian Construction Industry

H. H. Muhammad, A. H. Ibrahim, M. S. Elshennawy

Abstract— Crises are the most crucial challenges that face the administration of any institution; it has become rare to find any institution not exposed to, or is about to face some kind of crisis. For any firm, crisis has the possibility to threaten its reputation, profitability, competitiveness, market share, and ultimately its survival. Due to its complex nature, construction industry may face crises at organizational or sectoral level in general. This paper aims to conduct a survey among construction practitioners to assess the actual situation of crises management in the Egyptian construction industry. Based on an interviews survey held with 98 experts who have more than fifteen years of experience, who represent the main parties of the industry. The main finding of this paper is that, levels of application crises planning and management among the Egyptian construction firms was very low, it remains poor understood with very low level of interest. In addition, expert's familiarity, knowledge and practicing was loose. So, it became imperative to publicize the culture of crises planning and management among construction practitioners to benefit from it at both organizational and sectoral level of construction industry in Egypt.

Index Terms— Crisis, Crises Management, Construction Industry, Egypt.

I. INTRODUCTION

Crisis has become an integral part of the contemporary life fabric. It is “an abnormal situation” that can suddenly appear in an inescapable way. Indeed, the media makes the term “crisis” in a circulating concept across all levels and in different domain form public or private institutions of political, financial, economic, and social, environment, etc. The world of crises is alive and interactive; crises have causes, phases, and specific characteristics. It affect the states, governments, societies, organizations, even individuals. From among all business sectors, construction industry has a particular significance in most countries, with increased importance in developing countries where this industry plays a highly effective role in the overall process of development. Construction industry is characterized by its complexity, diversity, singularity, segmentation, multidisciplinary, and multiple parties. When operating within a more challenging environment where there are higher potential for occurrence of risks, accidents, problems, conflicts, etc., With a possibility of aggravating situations, managers may find

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Hossam El-Deen Hosny Muhammad, Professor, Head of Construction Engineering Department, Faculty of Engineering, Zagazig University, Egypt
Ahmed Hussaen Ibrahim Mahmoud, Associate Professor, Construction Engineering Department, Faculty of Engineering, Zagazig University, Egypt

Muhammad El Sayed Elshennawy, PhD Candidate, Construction Department, Faculty of Engineering, Zagazig University, Egypt

themselves facing crises, which should be dealt with, thus it became important to pay special attention for crisis planning and management. In general, here is only a limited number of researches dealing with such an important topic as crisis planning and management for the construction industry, in particular for the Egyptian construction industry these researches are rare, this study comes as one of those researches. This paper concerns are mainly two things:

Firstly, is to discuss the concept of crisis, its impact, crisis management, the importance of studying crisis management, regarding the construction industry.

Secondly, is to explore the situation of crisis planning and management in the Egyptian construction industry.

In accordance, this paper will try to answer the following questions: Is the concept of crisis planning and management well defined, known, accommodated among managers working in the Egyptian construction industry. Moreover, are the involvements of the Egyptian construction industry interested in the application of crisis planning and management?

II. LITERATURE REVIEW

The following literature review will establish the foundation for this study.

A. Definition of the Crisis

From the American Heritage Dictionary [1], “Crisis (Noun), (Plural, cri·ses): (a) A crucial or decisive point or situation, especially a difficult or unstable situation involving an impending change. (b) A sudden change in the course of a disease or fever, toward either improvement or deterioration. (c) An emotionally stressful event or traumatic change in a person's life. (d) A point in a story or drama when a conflict reaches its highest tension and must be resolved. The word crisis comes from the Greek language, crisis (κρίσις) meant (judgment) or (decision), and i.e. the decisive moment that determines the further positive or negative development of a thing or a situation”. From Webster's Dictionary [2] crisis “is figuratively a vitally important or decisive stage in the progress of anything; a turning-point”. The definition continues by specifying that, “a crisis is a state of affairs in which a decisive change for better or worse is imminent; now applied esp. to times of difficulty, insecurity, and suspense in politics or commerce”. The Oxford University Dictionary [3] describe crisis as, “A time of intense difficulty or danger”. From Cambridge University Dictionary [4] crisis is “A situation that has reached an extremely difficult or dangerous

point; a time of great disagreement, uncertainty or suffering”.

B. Understanding the Concept of Crisis

The term “crisis” has different meanings depending on the context of studying it, in their ongoing attempts many authors tried to define crisis practically wise to get access to understand this concept. One of the pioneers in this arena, Hermann [5] defined crisis as “a situation that suddenly occurred, characterized by its high priority with probable threats and accompanied by a short time that stress members of the decision-making team”. In his interpretation of the concept of crisis, Fink [6] considered that crisis reflects a crucial moment, turbulent, and uncertainty because it carries in its folds a higher danger with a possibility of potentially negative effects, but on the other hand, there is a possibility to benefit from this moment and turning it to become beneficial. Fink [6] also explained, that the crisis represents a turning point in which hazards aggravate, spread out, receive the media, draw the public opinion attention, governmental attention, and the right image about the organization may be damaged. In addition, there is a possibility of a financial impact either on the organizational or personal level. Weitzel and Jansson [7] considered that, from knowledge of management perspective, crisis is the last stage of the organization life before falling, at this stage; they will be just around the corner of writing the organization death certificate. In case of crises, it seems that there is a gap between needs and available resources, on the contrary to the normal situation. Moreover, what exacerbates the situation is the suddenness and the limited time available to behave and take appropriate decisions in such critical and tough times. Booth [8] considers the crisis as a damaging event, Coombs [9] explain further that, due to crisis there are a series of rapid events when it spin out of control, it lead to troubles for the firm system if they have lost its ability to handle, or cope with

it. However, the concept of crisis still has some confusion; this is because different disciplines tried to explain it.

C. Types of Crises

There were continuous attempts of researchers to distinguish between different types of crises. Rosenthal and Kouzmin [10] pointed out that, crises could be classified under two main categories: **Firstly**, crises by the act of God that are called “*Nature crises*”, that are due to natural phenomena. Examples for this are, is the situations resulted from earthquakes, volcanoes, tsunami’s waves, hurricanes, spreading of epidemics and diseases ...etc. **Secondly**, the crises resulted due to human behavior that are called “*Human made*”. Examples for this are, human mistakes, loss of control on technological applications and consequences from such effects, mismanagement attitude, troubles and problems in workplaces, workers strikes, spread of rumors, technical mistakes, market failure or depression, manufacturing defects or bad products, financial crisis, unsuccessful leadership, real estate crisis, economics policies crises ... etc. Another example for “*Human made*” is what done intentionally by some people or institutions for the purpose of harming or damaging competitor firm. Sometimes the top management of the firm deliberately fabricate crises to find out defects and imbalances within their firm, hence they can take corrective actions and rectify errors.

D. Characteristics of the Crisis

Authors of crisis literature cited several characteristics as shown in Table 1 below. It shows that researcher's perspectives differed according to the corner of the study; as a result, each one of them was interested in highlighting specific characteristics.

Table 1. Characteristics of the Crisis

Characteristics	Author(s)
<ul style="list-style-type: none"> • A crisis is a low-probability event; this characteristic makes the planning for a crisis even more troublesome, because events that are not perceived to be imminent are hard to plan for. • It is difficult for management to find the motivation to plan for such an event 	Crandall <i>et al.</i> [11].
<ul style="list-style-type: none"> • Crises are considered to be very sudden, severe, and associated with uncertainty. 	Fink [6]; Coombs [9]
<ul style="list-style-type: none"> • Often, there is a very short response time to address a crisis, since typically crises are unexpected 	Ulmer <i>et al.</i> [12]
<ul style="list-style-type: none"> • Crises can happen to anyone at any time and do not differentiate between victims whether good or bad, all are affected the same. • Crises can range from local to an international scale • Communication channels are often disrupted 	Rosenthal, Kouzmin, [10]
<ul style="list-style-type: none"> • The victims of a crisis often feel weak, helpless, and shocked 	Pearson, Clair, [13]
<ul style="list-style-type: none"> • Crises bring about the context of fear and disruption to everyday activities and normal positive managerial operations. 	Laufer [14]
<ul style="list-style-type: none"> • There is an element of damage with a crisis and a chance of injury, harm, death, or destruction of property 	Lerbinger [15]
<ul style="list-style-type: none"> • Crises are dynamic, can result in a chain reaction or ripple effect, have stages or phases, and can be caused by different factors. • A crisis can be a threat to basic human needs and well-being. 	Pauchant, Mitroff, [16].
<ul style="list-style-type: none"> • All crises deal with disruption of information, knowledge, and understanding, that’s causing trouble for stakeholders. 	Gilpin, Murphey [17]

E. Impact of Crisis

From the perspective of Fink's [6] crisis is not always bad, but it may be rather good, crises have two faces, the black face is the bad effects of crisis on people or organization, while the white face of crises is benefits that could be gained and lessons learnt from the crises. In the Chinese (Mandarin) language, the word crises uttered (wei-ji) that includes two syllables, the syllable (wei) means "danger", while the syllable (ji) means "opportunity" [19]. In general, the concept of crisis can be called a two-sided coin, or a double-edged sword. Crises may come carrying fears, panic, threats, destruction, losses, danger ...etc. On the other hand, crises enable the administration to put their hands on the glitches; weaknesses in the entity then work to strengthen them, discover the strengths and hence increase them. Finally, in summarizing the above, crisis is a decisive moment concerned with the destiny and survival of the entity that was hit by it. It is a turning point for the better or worse, it includes not only the threat but also an opportunity for change to the better.

F. Negative Impact of Crisis

In crises times, negative impacts are expected to take place, it may be:

- There is a possibility of total collapse to the familiar structures of the organization that gives it its legitimacy, and threatens the core values upon which it stand on.
- The successive speed of events threatens the ability of people, organization, and the community to survive.
- Disruption of a system, uncertainty of the situation, fuzziness of events, all of these create a sensation of inability to hold the reins of power.
- When things go for worse, it will attract the media's attention [14].
- In the absence of good preparation, planning, and management of crisis, there will be a state of confusion, panic, fear, haste, and urgent demands [15].
- The principles and values that are considered constants in normal times may turn to be non-important, this is because the surrounding circumstances may force towards the waiver of those values; these times are called "An exceptional time" [16].
- Crises shake stakeholders and people's confidence in themselves and in the institutions. It affects the organizational structures, by extension crises disrupt organization's mission and vision on which it built its strategic plans [17] [18].

G. Positive Impacts of Crisis

Many of those who were interested in studying the crises focus most of their attention on the negative effects of the crisis, while they should be also highlight the positive aspects of the crises, Fink [6]; Lalonde [20]. Crises can summon the positive values at both individual and institutional level, during crises the values of cooperation and altruism may be appear clearly, Lalonde [20]. Considering the positive aspect of the crisis, organizations can gain many benefits from the lessons learnt and the feedback after the end of crisis [12]. Examples of some advantages gained from crisis are the following:

- Enhance feelings of compassion, sympathy and cooperative spirit.
- Promoting integrity among the victims of the crisis.
- Developing the performance in terms of mastering distribution of roles and assignment of responsibilities.
- Draw attention towards preparing plans and new strategies to cope with the crises.
- Proficiency in dealing with crises, developing abilities to take quick resolutions, innovative decisions, and mastering the transition to stabilizing the situation.
- The ability of system administration to absorb crisis shock, recover from its impact, and rehabilitation of the firm increase their confidence in themselves, and improve their cumulative experiences.

H. Organizational Crisis

Fearn-Banks [21], considers the organization crisis as an important and influential event that potentially produces a significant impact on the products, provided services, market share, the consumer, the organizations itself, or the industry as a whole causing a serious consequences leading to a negative impact on both individuals and institutions. Pearson and Clair [13], believe that, despite the crisis that may occur to the organization are of low probability, but they have a great impact on the organization when they occur, this is because the influence spreads as the wildfire, crisis damage all interests of the stakeholders without exception. Snyder et al. [22] argued that, the crisis facing the organization is the unusual situation that restrain the normal process of the organization, causing severe damages and disruption that prevents the organization to achieve its goals.

I. Crisis Management

Crisis management is the function that works to minimize the impact of a crisis and helps an organization to gain control of the situation. It also operates to take advantage of any benefits that a crisis may present. Such as, the demands of daily operations and crises management are so important that the organizations need to implement crises management plans and teams in order to rehabilitate the organization, restore the normal course of activities to its previous track, remedy the adverse effects of the crisis, and to achieve continuity in business operations [11].

Pauchant and Mitroff [16] argued that crisis management has become an essential component of all plans prepared by business organizations. It is a comprehensive and integrated package of organized procedures to be taken by organizations managers to deal with such unseal critical situation, which it would be possible exposed to either on the organization level or on the sector it belongs to. Documenting the events, and benefit from in the future.

J. The Evolution of Crisis Management

Crisis management, in the current sense of the phrase, began as studies in military operations during wartime. Military experts like Francis J. Lippitt (1865) wrote about preparations for attack, defense, and tactical operations. Bell [23] believes that, Robert McNamara the secretary of USA defense was the first who coined the phrase "Crisis Management". Whilst, Milašinović and Kešetović [19]

claimed that, American president John F. Kennedy. Anyway, whatever the view is, all researchers agree that the situation in which this expression originated was during the Cuban Missile Crisis of 1962. Crisis management played a crucial role in some situations that resulted from faults or severe incidents thereby these situations highlighted on crisis management and increased attention to it particularly after remarkable successes achieved in such situations. The success achieved in handling the Tylenol drug crisis of 1983 situations has drawn attention to the importance of crisis management. It became one of the administrative activities, and as a result, the rising frequency of interest in crisis management in knowledge management research was noticeable.

K. Characteristics of Construction Industry

Construction industry has its own special characteristics, so it becomes important to discuss some of these characteristics, which are:

- **Complexity:** Construction projects are extremely complex and tangled due to:

Firstly, multiplicity of parties, each party of them deals with another complex network, the contractor for example, deals with banks, subcontractors, suppliers, workers... etc..

Secondly, multiplicity of activities that differ in its phases and overlap, beginning with initiation, closing and delivery completion.

Thirdly, variation of the required resources for projects, it ranged from human resources, to materials needed for the projects, equipment, and software.

- **Diversity:** Construction industry is diverse in its nature, this is due to project conditions which differ from country to another, even sites are different in the same country, also projects differ in terms of design, volume of works, labor intensity, required resources, funding sources, and the project delivery agreements.
- **Segmentation:** construction projects composed of multi-stages, each stage has its own requirements, properties,
- **Singularity:** Construction projects are characterized by their uniqueness and non-repetitive operations, it is difficult to find similarity between one project and another.
- **Discontinuity:** Most construction projects are not continued forever, even in case of continuity each project is governed by a limited time. The limitation of project time affects the relationship between project members; it seems as superficial.

L. Critical Issues in Construction Industry

Of all business sectors, the construction industry is particularly important because being the main driver for many other sectors such as industry, transport, trade, financial sector and banking. Construction industry also, affecting industrial sectors, absorb a lot of different professions, disciplines, crafts and labors. In spite of the great and high importance of the construction industry, but among many other sectors it sometimes has a negative image in public opinion owing to several reasons, for example:

- The numerous disputes that arise among construction parties due to opposite goals and conflicts of interests.

- Delays and defects that appear in some projects after execution and delivering it.
- Prices fluctuation, high inflation indices in certain times leading to disputes and claims.
- Short duration of the relationship between constructions parties makes it based on distrust, fear, and suspicions.
- Construction industry is affected by governmental politics, wars, and current events in countries. Moreover, regional and international disputes are not immune to influence it
- Accidents and injuries that arise during execution of projects.
- Construction industry affected by seasonal activities, especially in developing countries.

All foregoing may be a source of problems, risks, disputes, or any other hazards that could evolve to a critical situation.

M. Construction Industry and Crisis Management

There are numerous sources of crises in construction industry, these sources looks more likely to take place more than those in other sectors. Crises may occur due to ambiguity of information, financial markets collapse, natural disasters, fraud and deceit, technical malfunctions, human errors, and technological crashes [15]. It has become necessary for managers in construction industry to prepare for crises. Neglecting the sources of hazards in construction industry may evolve to a situation that threaten the firm's reputation, employments; even the firm's survival [24]. Managers in the construction industry must include crises management plan within the strategic plans of their firms. Although there are, a boom in the project management studies interested in the construction industry in general, but the interest in crisis management associated with this industry remains modest, it focuses on the reactions as a response to the effects of the crisis [24]. Loosemore [24] considers that, construction firms must pay attention to the proactive activities that are concerned with the question: How can construction firms prevent crises before its occurrence, in addition: How to deal with crises if things went wrong and the situation evolved.

III. METHODOLOGY APPROACH

Methodology is the procedures and principles taken by the researcher through the realization of scientific and logical thinking to complete the scientific research to the issue under study, Fellows and Liu [25]. The survey method the is most appropriate methodology performed to achieve the overarching aim and objectives of this research; it is defined as the organized scientific method for gathering data about the subject under studying, from a person or a group of attributes people related to this subject. To explore the situation of crisis management, research was conducted using a series of intensive face-to-face interviews with experts of the Egyptian construction industry.

A. Face-To-Face Interviews

Frankfort-Nachmias and Nachmias [26] consider conducting face-to-face interviews relies on directing a set of questions prepared in advance to get answers related to the hypothesis of the researched topic. Oppenheim [27] argued that, this type is called exploratory interviews surveys have

several advantages. One of the most important advantages of this approach is that it provides a deep understanding of the researched topic, the hierarchy of the survey questions explain smoothly understanding of the topic under studying, and hence for those who are interviewed they can accommodate the study, finally, the study can achieve its goals. Interviews also, create a close link, mutual understanding and acquaintance between the researchers and respondents, it assists the researcher to explain friendly the confusion and ambiguity points, as a result the researcher can rely on this relationship and benefit from in the later stages of the search [28].

B. Design the Interview List of Questions

To achieve a deeper understanding, a closed list of statements built with steady pattern was used; this makes response easier for the interviewees and more helpful for researchers in the analysis of data. Beside the formal request for the interview, the interview documents consists of three sections:

1. Personal information and knowledge about the interviewee and the firm,
2. To avoid confusion in the concepts, an explanation for some scientific definitions (risk, problem, trouble,...) were discussed before proceeding to poll opinions about the statements (questions) of the interview,
3. Respondent's opinions about crisis, crises planning and management in the Egyptian construction industry. There was a list of 37 statements prepared in advance to poll whether the interviewee agreed or disagreed with the statements stated to him, a seven-point Likert scale used for measuring degree of agreement or disagreement for the statements in accordance to each question.

The respondents had to evaluate their conceptions about the statements as the following: seven given for "Strongly Agree", six given for "Agree", five given for "fairly agree", four given for "Neutral", three given for "fairly disagree", two given for "Disagree", finally, one given for "Strongly Disagree". The interview list of statements was piloted by a small sample of respondents to test whether the questions are easy to answer and clear, the feedback of the respondents was helpful in improving the interview questions, fill in gaps, and determine the time required for completion. A translation for statements in the Arabic language has been provided for convenience purpose.

C. Sample Size

In this research, to find out the number of the society understudying, it was impossible to determine a definitive number for such society because there are several institutions for registration of the parties working in the construction industry in Egypt, perhaps the linkage between each other is not good. Such hands are the Egyptian federation for construction and building contractors, chambers of commerce, the Egyptian syndicate of engineers where consultant are registered, and finally academics interested in the studies of construction project management. So, the sample size was calculated according to the formula, which was applied in case of inability to determine accurately the study population, formula (1) was used as:

$$N = \frac{Z^2 \times P(1-P)}{c^2} \quad (1)$$

Where:

N = Sample Size

Z = standardized variable (e.g. 1.96 for 95% confidence interval).

P = percentage picking a choice, expressed as a decimal

C = confidence interval, expressed as a decimal (for Precision (e)) [29]

Considering a 95% confidence level corresponds to $\alpha = 0.05$, as with most other research assumed [29]. In the two tails normal distribution shape, the region to the right and to the left of $\alpha/2$ called Z (sometimes called $Z_{\alpha/2}$), from the table of standard normal distribution, the critical value is therefore (Z) or $Z_{\alpha/2} = 1.96$. (C) Is the confidence interval (sometimes called the margin of error) often ranged between $\pm 10\%$ as suggested by Maisel and Persell [30], it is assumed to be $\pm 10\%$ for this research. Czaja and Blair [29], advised that in the case of calculating the sample size to give a certain level of accuracy, assume that the worst-case percentage picking a choice (p). In this case, (p) is assumed as 50% or 0.5. Based on the pervious values and assumptions, hence the estimated sample size is 97.

D. Sampling Procedures

To get the required number of sample size that was previously calculated with verifying the condition of practice and experience for more than fifteen years. Considering the well-known methods for gathering data, the helpful manner called "Snowball technique" was considered the most appropriate to reach the required number as the conditions mentioned. The idea of this method is based on communication with acquaintances and colleague networks, they asked to nominate or referral for others and so on [31].

An initial list of the appropriate construction practitioners to be interviewed is prepared based on the following criteria: construction practitioners who have more than fifteen years of experience in the Egyptian construction industry. The researcher sent and delivered 175 request, only 102 agreed to be interviewed, refusals were contacted to investigate reasons of non-participation. Their reasons ranged between, they prefer not to give information, or disinterest, some replies praised the research, but apologized for being busy. The interviews sessions were held in the period from June 2016 to the end of December 2016.

E. Data Analysis Using Statistical Tool

The data collected was analyzed by using Statistical Package for Social Sciences (SPSS) version 22. First step was to obtain descriptive statistics that include means, and standard deviation. Based on means, statements were ranked in order. Since, statements (questions) of the interview were prepared to measure answers in ordinal scale which was expressed by Likert scale, the distance between numbers on the scale is not definitive, so it is required to apply a non-parametric test. One of the major non-parametric tests is Kruskal-Wallis (KW); it is used to measure agreement between two or more groups of respondents. The final step was to apply reliability analysis.

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F. Descriptive Analysis

102 Interview sessions were held, 4 were excluded for some errors and missing data, 98 valid data were collected from interview sessions distributed as following (13 Academic, 16 Developers and Owners, 17 Consultants, and 52 Contractors). Statements list used in interviews were mainly prepared to get answers that mostly generate descriptive details when analyzed, and interpreted statistically. The descriptive statistics for the overall statements stated in the interview's statements list are shown in Appendix I. Since, statements were worded to accept either agreement or disagreement from the interviewee's point of view, so it is important to determine which statements obtain agreement and which obtained disagreement. Statistical means were obtained by dividing the total score for each statement by the number of respondents. Statements were ranked in descending order based on the values of means giving first order for the statement that received the highest

mean. The statements which have values of means (≥ 6), were considered to have significant effect in agreement as (6) was given for "Agree". From the interview's statements list, the corresponding statements that represent full agreement and strongly agreement are stated in Table 2. Below. The percentage of agreement and strongly agreement on statements stated in Table 2. Is shown in Fig. 1. On the other hand, statements were ranked conversely in descending order based on the values of means (≤ 2), the lowest value having a rank of 1 by giving first order for the statement that received the lowest mean. These statements were considered to have significant effect in disagreement, as (2) was given for "Disagree". From the interview's statements list, the corresponding statements that represent full disagreement and strongly disagreement are stated in Table 3. Below. The percentage of disagreement and strongly disagreement on statements stated in Table 3. Is shown in Fig 2.

Table 2. Statements Ranged Between Agreement and Strongly Agreement

Rank	Statements	Mean
1	Crisis planning and management is the responsibility of policy, decision makers and construction industry parties all together.	6.46
2	Some crises could be avoid if it is early discovered	6.45
3	Any firm can go into a somewhat type of crisis at any time.	6.44
4	Crisis may be arise from reasons related to internal causes of work.	6.40
5	Crisis may be arise from reasons related to the external causes of work.	6.37
6	Application of Crisis management plans is the responsibility of policy and decision makers.	6.36
7	Application of Crisis Management plans can contribute in achieving the goals of construction industry at the national level.	6.36
8	Most firms encountered earlier some kind of crisis.	6.32
9	Construction involvements should cooperate for good application of crisis management plans at the industry as a hole.	6.29
10	Merging crisis management within firm's strategic plan would be useful.	6.24
11	Application of Crisis Management plans can help in achieving the long-term and short-term goals of the firm.	6.22
12	Crisis management team must have special skills.	6.22
13	It would be preferred to hire specialists to manage crisis.	6.18
14	Crisis Management can remain firm's capture stable.	6.17
15	Application of Crisis management plans is the responsibility of the construction industry parties.	6.09
16	Data collected from Crisis Management improve performance.	6.02

Table 3. Statements Ranged Between Disagreement and Strongly Disagreement

Rank	Statements	Mean
1	There is no need to waste resources on crisis management plans.	1.6
2	Construction managers were familiar enough with the concept of "Crisis Management"	1.7
3	Firms conducted simulation of crises experiments to test the readiness to manage crises.	1.82
4	Institutions at the national level of the industry will be able to cope with without a pre- planning and preparation.	1.82
5	In case of crisis inside the firm, it would be easy to cope without pre-planning and preparation.	1.9
6	Firms prepared a trained and qualified team for crisis management.	1.95
7	Firms appointed a specialized team for scanning work environment	1.96

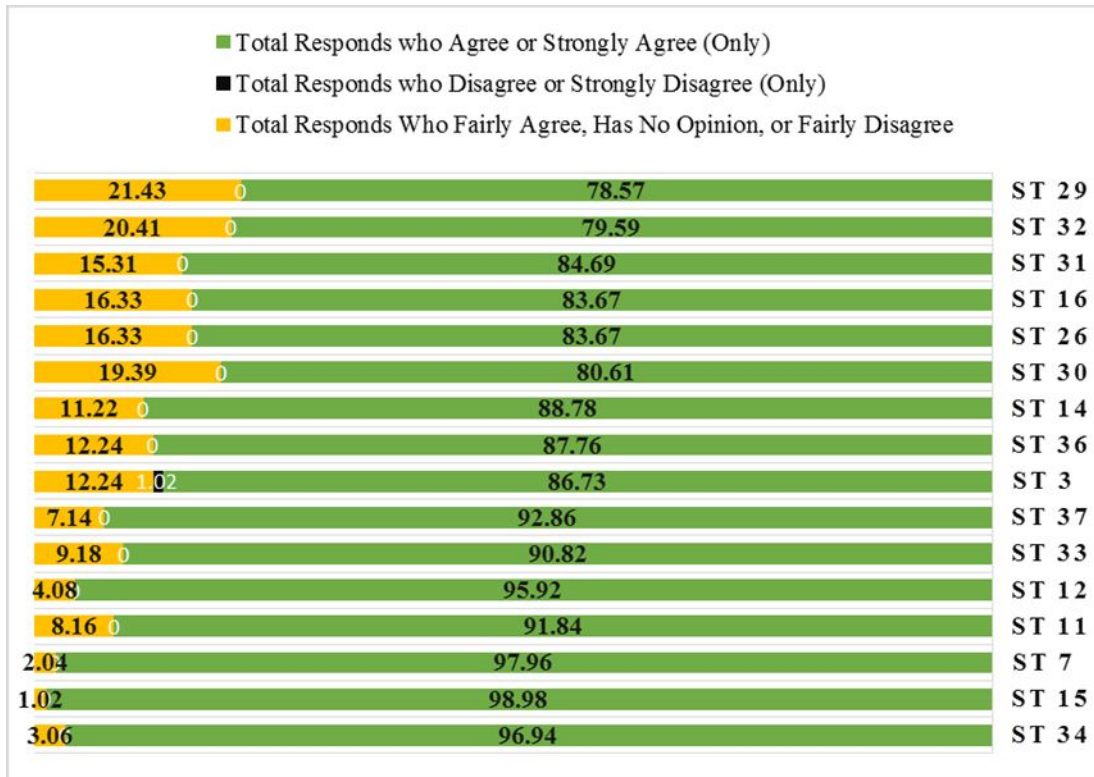


Fig. 1. The percentage of agreement and strongly agreement on statements.

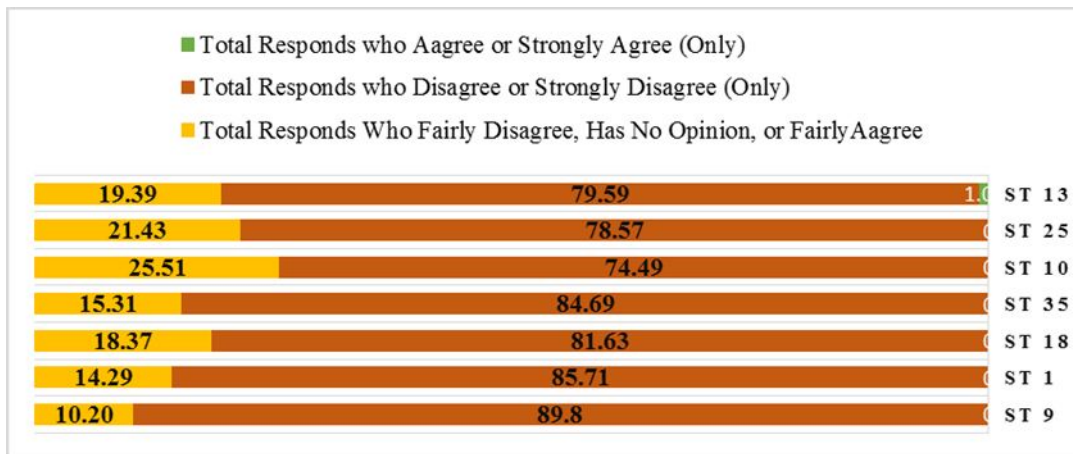


Fig. 2. The percentage of disagreement and strongly disagreement on statements.

G. Agreement analysis (Significance Test)

As a non-parametric test the “Kruskal-Wallis” (KW), (known as H test), used to analyze the agreement among the four parties of the respondents. Since the gathered opinions come from different parties, so, this test is applicable in case of presence two or more groups participated in the research under a condition that each group sample is independent from the other groups belonging to the population samples. This test submits a comparative analysis to recognize the four parties' opinions. The test was applied at a level of confidence 95%. Statistically wise, looking for the values of (p) corresponds to each category, in case of the null hypothesis $H_0: \mu \leq \mu_0$ or $(p) \leq 0.05$ then the null hypothesis will accept, we can say that there is a significant difference between the categories; which means that there is no full agreement

between the population categories. Alternatively, in case of alternative hypothesis $H_a: \mu > \mu_0$, or $(p) > 0.05$ then we can say that there is no significant difference between the categories hence; the null hypothesis will reject, hence the alternative hypothesis was accepted which means that there is a full agreement among the population categories. Table 2. Shows the results of (KW) which indicate a full agreement among the four parties on the ranking of statements.

H. Reliability Analysis

The reliability or “internal consistency” is measured by calculating “Chronbach’s Alpha coefficients”. Alpha values ranging between zero and one, the higher the value of alpha consider excellent reflective for consistency of measurement items. All alpha values were calculated for each discipline, it was 0.908 for Academic, 0.749 for Contractor, 0.912 for

Consultant, and 0.868 for Developers & Owners. The overall alpha value is 0.848; results can conclude that the measurements are reliable. Values of alpha are shown in Table 2, it seems to be between excellent and very good as suggestion of Nunnally and Berstein [32].

IV. INTERVIEWS FINDINGS

Outcomes of the exploratory survey showed that among construction experts with experience more than 15 years, there is completely *agreement* that:

- Application of Crisis Management plans is the responsibility of policy and decision makers and construction industry parties all together.
- It would be possible to avoid some crises if it early discovered.
- Most construction firms encountered earlier some kind of crisis.
- Crisis may be stemming from reasons related to either the internal or the external work environment.
- Construction firms can go into a somewhat type of crisis at any time.
- Application of crisis planning and management can help in:
 - Achieving the long-term and short-term goals of the firms.
 - Improving performance.
 - Achieving the goals of construction industry at the national level.
 - Maintain the stability of the firm's image.
- It is preferable to hire specialists for assisting in managing the crises.
- Merging crisis management within firm's strategic plan would be useful.
- It is important to prepare crisis management teams with special skills.
- Data collected for crisis planning and management can improve performance.

Table 2 below show the statements ranged between agreement and strongly agreement ranked based on its means as it obtained from statistical analysis results.

On the other hand, there is complete *disagreement* regarding some statements, these are:

- Allocating resources on crisis management plans are not useful.
- Construction experts were familiar enough with the concepts of: "Crisis, and Crises Management".
- Firms does not conduct simulation of crises experiments to test the readiness to manage crises.
- In case of crisis, at the national level of construction industry, the official institutions would not be able to cope without pre-planning and preparation.
- In case of crisis inside the firm, it would not be easy to cope without pre-planning and preparation.
- Most of firms do not prepare a trained and qualified team responsible for crisis management.
- Most of firms appointed a team for situational work environment scanning.

Consequently, the opposite would considered true. It is noticeable that, the previous statements, which represent disagreement, are carrying the same meanings correspond to the statements represent agreement, that is confirming the results.

V. CONCLUSIONS

This study offers a significant insight into the crisis management as a relatively new area of knowledge in an attempt to transfer this science into the construction industry. In addition, this paper explored the existing situation of crisis planning and management in the domain of the Egyptian construction industry. Based on this study, there are some important results, hoped to be useful for the construction industry; the results reveal that, yet very low the level of crisis management among managers in the Egyptian construction firms; it remains low and poorly understood with low levels of interest. In addition, there was a lack of knowledgeable personnel. The study showed the importance of the roles that can be played by each of construction industry parties also, decision and policy makers. Furthermore, there is a pressing need for construction firms being more conscious about the importance of crisis management, prepare for merging crisis management plans within its strategic plans. Outcomes of the exploratory interviews have consolidated the research aim and prepared the ground for build on. The interviewed were asked if they had a willingness to participate in a next step. Almost all interviewees showed interest in the subject and were willing to assist. Finally, this study provided a modest contribution added to the science and knowledge related to the construction industry in Egypt. Researchers in the arena of the Egyptian construction industry need to be more aware of crisis management. In addition, deploying the culture of crisis management not only in construction industry, but also in all walks of life. Like most studies, none of up to perfection! There are some reservations regarding this study most notably that, although calculation of sample size is agreeing with the criteria followed to obtain the sample size in such cases, but the sample size is considered relatively small, which makes us say it would be better in future to perform this research by increasing the sample size. Moreover, it is recommended to expand and conduct this research in other countries.

REFERENCES

- [1] The American Heritage Dictionary of the English Language, 5th Ed., Published by Houghton Mifflin Harcourt Publishing Company.
- [2] Webster's New World College Dictionary, by Wiley Publishing, Cleveland, Ohio John Wiley & Sons, Inc.2010.
- [3] The Oxford University Dictionary, 2nd Ed, 2012.
- [4] Cambridge University Dictionary, Cambridge University, 2011.
- [5] Hermann, C. F., "10 Challenges of Crisis Management", Crisis Management Vol. II Edited by Arjen Boin, Published by SAGE Publications Ltd, 2008.
- [6] Fink, S., "Crises Management: Planning for the Inevitable", American Management Association, New York, 1986.
- [7] Weitzel, W. and Jonsson, E., "Decline in Organizations: A Literature Integration and Extension", Administrative Science Quarterly, 34: 91-109, 1989.
- [8] Booth, S. A., "Crisis Management: Strategy, Competition and Change in Modern enterprises", Routledge, London, 1993.

- [9] Coombs, W. T., "Ongoing Crisis Communication: Planning, Managing, and Responding", Sage Publication, Los Angeles, 2007.
- [10] Rosenthal, U. and Kouzmin, A. "Crisis and crisis management: Toward Comprehensive Government Decision Making", Journal of Public Administration Research and Theory, 7(2), 277-304, 1997.
- [11] Crandall, W., et al., "Crisis Management in the New Strategy Landscape", SAGE Publications Inc., Thousand Oaks, California, 2010.
- [12] Ulmer et al. "Effective Crisis Management Through Established Stakeholder Relationships: Malden Mills as a Case Study", Management Communication Quarterly DOI: 10.1177/0893318901144003 Published by SAGE, 2007
- [13] Pearson, C. M., and Clair, J. A., "Reframing Crisis Management", Academy of Management Review, pp.59-7623(1), 1998.
- [14] Laufer, R. "Crisis Management and Legitimacy: Facing Symbolic Disorders", In C. M. Pearson, C., and Roux-Dufort A. and Clair, J., Eds. of "International Handbook of Organizational Crisis Management", (pp. 25-83), SAGE Publications, Los Angeles, 2007.
- [15] Lerbinger, O. "The Crisis Manager: Facing Risk and Responsibility", Lawrence Erlbaum Associates, Mahwah, 1997.
- [16] Pauchant, T. C. and Mitroff, I. "Transforming the Crisis-Prone Organization: Preventing Individual, Organizational, and Environmental Tragedies", Jossey-Bass Inc. San Francisco, 1992.
- [17] Gilpin, D. and Murphy, P. "Crisis Management in Complex World", Oxford University, USA. New York, 2008.
- [18] Hwang, P., and Lichtenthal, J. D. "Anatomy of Organizational Crises. Journal of Contingencies and Crisis Management, 8(3), 129-140. DOI: 10.1111/1468-5973.00132, 2000.
- [19] Milašinović, S. and Kešetović, Ž. "Crisis and Crisis Management, a Contribution to a Conceptual and Terminological Delimitation", Megatrend Review, Vol. 5 (1) pp.167-186, 2008.
- [20] Lalonde, C. "In Search of Archetypes in Crisis Management", Journal of Contingencies and Crisis Management, 12(2), 76-88, 2004.
- [21] Fearn-Banks, K. "Crisis Communications: A Casebook Approach", Lawrence Erlbaum Associates, Mahwah, NJ, 2007.
- [22] Snyder et al. "Ethical Rationality: A strategic approach to organizational crisis", Journal of Business Ethics, 63, p. 371-383, 2006.
- [23] Bell, C. "The Conventions of Crisis: A Study in Diplomatic Management", Oxford University Press, New York, 1971.
- [24] Loosmore, M. "Crisis Management in Construction Projects", ASCE; 2000.
- [25] Fellows, R., and Liu, A., "Research Methods for Construction", Chichester: John Wiley & Sons Ltd. 2008.
- [26] Frankfort-Nachmias, C., and Nachmias, D., "Research Methods in the Social Sciences", 5th edition New York: St. Martin's Press. 1996.
- [27] Oppenheim, A. N. "Questionnaire Design, Interviewing and Attitude Measurement, Continuum", London, New York, 2005.
- [28] Naoum, S. "Dissertation Research and Writing for Construction Students", 2nd edition. London: Butterworth-Heinemann. 2007
- [29] Czaja, R., and Blair, J., "Designing Surveys, A Guide to Decisions and Procedures", Thousand Oaks, CA, Pine Forge Press, 2005.
- [30] Maisel, R. and Persell, C. H., "How Sampling Works", Thousand Oaks, California, Pine Forge Press, 1996.
- [31] Sekaran, U., "Research Methods for Business: A Skill-Building Approach", 4th edition. Wiley, New York. 2003.
- [32] Nunnally, J., and Bernstein, I., "Psychometric Theory", McGraw-Hill. New York, 1994.



Prof. Hossam Hosny Mohammed is the Head of Construction Engineering Dept., Faculty of Engineering, Zagazig University, Egypt. He shares his time between the Construction Engineering and Research Methodology Programs at Zagazig University in Egypt where he teaches construction engineering management subjects. He holds a PhD in and a Master's Degree in Civil Engineering.



Assoc. Prof. Ahmed Hussein Ibrahim is an Associate Professor of Civil Engineering at Faculty of Engineering, Zagazig University, Egypt. His research interests include systems modeling and optimization, and the application of artificial intelligence (AI) techniques to complex engineering domains.



Eng. Muhammad El Sayed Aly El Shennawy is working as general manager at *Al Bonyan for Development and Construction Projects Management*, (a limited liability Egyptian company). As a member of the construction industry for over 30 years gained a considerable understanding of the engineering and management on construction projects. He worked on large and small construction project sites, for contractors and for owners. In addition, he earned the Certificate of Experts for Real Estate Appraisal and Marketing from Ain Shams University, Egypt. He is a Ph.D. candidate at Construction Engineering Dept., Zagazig University, Egypt. His fields of interest include methods of construction, management topics and applications of improving quality & performance in construction firms.

Exploring the Situation of Crises Management in the Egyptian Construction Industry

Appendix I. Descriptive Statistic

	N	Mean	Std. Deviation	Skewness		Kurtosis		Rank
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error	
ST 34	98	6.46	.559	-.378-	.244	-.875-	.483	1 Agr.
ST 15	98	6.45	.520	-.016-	.244	-1.497-	.483	2 Agr.
ST 7	98	6.44	.539	-.156-	.244	-1.149-	.483	3 Agr.
ST 11	98	6.40	.638	-.580-	.244	-.592-	.483	4 Agr.
ST 12	98	6.37	.563	-.163-	.244	-.766-	.483	5 Agr.
ST 33	98	6.36	.646	-.502-	.244	-.655-	.483	6 Agr.
ST 37	98	6.36	.613	-.391-	.244	-.638-	.483	7 Agr.
ST 3	98	6.32	.820	-1.795-	.244	6.465	.483	8 Agr.
ST 36	98	6.29	.674	-.413-	.244	-.776-	.483	9 Agr.
ST 14	98	6.24	.719	-1.084-	.244	2.947	.483	10 Agr.
ST 30	98	6.22	.753	-.398-	.244	-1.133-	.483	11 Agr.
ST 26	98	6.22	.903	-1.492-	.244	3.006	.483	12 Agr.
ST 16	98	6.18	.765	-.891-	.244	1.663	.483	13 Agr.
ST 31	98	6.17	.813	-1.272-	.244	3.051	.483	14 Agr.
ST 32	98	6.09	.898	-1.231-	.244	2.344	.483	15 Agr.
ST 29	98	6.02	.746	-.642-	.244	1.439	.483	16 Agr.
ST 21	98	5.80	.984	-.902-	.244	2.610	.483	
ST 27	98	5.49	1.607	-1.617-	.244	2.182	.483	
ST 5	98	5.31	1.880	-.902-	.244	-.795-	.483	
ST 24	98	5.03	1.961	-.772-	.244	-.819-	.483	
ST 23	98	4.96	1.861	-.763-	.244	-.796-	.483	
ST 22	98	4.86	1.573	-.538-	.244	-.983-	.483	
ST 8	98	3.61	1.831	.100	.244	-1.279-	.483	
ST 6	98	3.59	1.877	.250	.244	-1.371-	.483	
ST 20	98	3.18	1.869	.404	.244	-1.288-	.483	
ST 19	98	2.93	1.694	.503	.244	-1.242-	.483	
ST 2	98	2.54	1.676	.921	.244	-.518-	.483	
ST 28	98	2.41	1.361	1.124	.244	.683	.483	
ST 4	98	2.39	1.557	1.033	.244	-.342-	.483	
ST 17	98	2.27	1.273	.955	.244	.093	.483	
ST 13	98	1.96	1.209	1.579	.244	2.034	.483	7 Dis Agr.
ST 25	98	1.95	1.049	1.416	.244	2.058	.483	6 Dis Agr.
ST 10	98	1.90	.958	1.070	.244	1.296	.483	5 Dis Agr.
ST 18	98	1.82	.912	1.374	.244	2.552	.483	4 Dis Agr.
ST 35	98	1.82	.988	1.689	.244	3.262	.483	3 Dis Agr.
ST 1	98	1.70	.840	1.462	.244	3.115	.483	2 Dis Agr.
ST 9	98	1.60	.670	.669	.244	-.606-	.483	1 Dis Agr.
Valid N	98							