

Systemic Analyzing the Current Challenges in the Field of Public Health and Safety in Urban Construction: Case study Mazandaran Province

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ABSTRACT

Accidents that occur during operation of building constructions are bitter and tragic incidents that kill and injure many individuals and cause considerable property damage and other consequences associated. Thus, the study of the causes of these accidents in order to adopt the necessary measures to prevent them is inevitable. In this research, study and analysis of accidents on building sites in different cities of West Mazandaran, was written based on the systemic vision, for the first time, to determine the causes of accidents at construction sites, indirect factors considered with an expert view and eventually classified into several subjects. In studying the Factors influencing the accident in the system vision, a range of factors ignored in the ordinary look, to be determined. Also, in this study, the issue has not been raised in the context of safety, and world's new look, the health, safety and the environment (HSE) has been considered. Regarding the type of research conducted, the achieved results and solutions can be effective and useful in improving the health, safety and environmental protection in the construction sector, and involving the use of standard materials, strengthening the bonds of executive and management commitment to strengthen and increase the number of skilled workers and establish a comprehensive system construction as a single system in the country, according to the study seems necessary.

Key words: Work accidents, Construction accidents, Health, Safety, Environmental protection, Building.

INTRODUCTION

Sometimes terrifying story of a construction accident- accidents at constructions sites that occur during operation- Published in Iran. Bitter and tragic incidents that kill and injure many individuals and cause considerable property damage and other consequences associated. According to available statistics, more than thirty percent of work-related accidents occur in the building sector and in some areas the figure is even more than sixty percent. Also, the numbers of incidents go unreported and unrecorded for various reasons should also be added to these figures. What is ascertained, fatality

and disability in construction accidents and certain other consequences of these events are never compensated, even if you assume that the financial losses will be compensated somehow. Usually the result of some of these events, wavelike shape includes media Releases, opinions and judgments of some individuals, with public sentiment excited and some urgent and non-professional actions and decisions begins and in a short period of time will also depreciate. According to the following expression, obviously, such a situation can never be appropriate, therefore, measures to reduce these incidents and bring it to zero are very necessary and urgent. (maghsoodloo *et al.*, 2007) As construction

accidents considered by a systemic view, a better understanding of the complex nature of the incidents and a more complete understanding of the factors causing it achieves. Building managers are often in conflict with safety as an additional cost and are less interest to safety management than Supervisors. Standards of safety, health and environmental protection should be continuously and design, implement and run as a complete systemic vision. At construction sites, creating the HSE to meet the health, safety and environmental protection is essential. In the systemic vision, in addition to the direct causes of the accident, including physical, chemical, biological and ergonomic theory of the cause of the accident is expressed, indirect causes, which is very impressive also identify (torkashvand *et al.*,2011)

MATERIALS AND METHODS

In this study, we used a special form which topics of the subject by studying the documents were extracted and they were recorded in forms. Questionnaire no1 were surveyed on the research topics from groups of stakeholders and experts. The questionnaire is an open question (after identifying areas of the subject), considering the needs of the audience were asked to insert. While the question of the audience in some way with the constraints faced and for some specific experts, the interviews were used to provide the requested information is contained in the questionnaire. Questionnaire no2 were used to achieve research points. Research topic derived from the results of the questionnaire, documents and interviews to study the sources listed in the questionnaire and completed by specified Individuals in each group. Who were questioned was not randomly selected and everyone has been chosen with the knowledge and commensurate with the extent of their influence in decision-making, implementation and monitoring of the construction. The population was divided into three groups of 50 subjects each were selected. The first group includes experts were faculty members and administrators and the second group consists of designers, performers and observer engineers and the third group consists of construction workers. The main objective of this study was to determine and prioritize the causes of construction accidents from the view of experts and practitioners but also the

statistical analysis of the data was studied. Data analysis in this study has been done in two level of descriptive and inferential (To do this, the software spss, version 20 is used). In the description level the frequency distribution, percentage and ranking used and in the inferential level, statistics Friedman's test for two-way analysis of variance and Kruskal-Wallis one-way analysis of variance with the ranks and independence of the statistical sample group of the various statistical and experts opinions has been used (barooj *et al.*,2011)

The main evaluation factors in crisis management and safety and the environment from the perspective of engineers and experts using the results of the Kruskal-Wallis and Friedman test, from engineers opinion, the most important factors in crisis management and safety and environmental protection in urban construction in order of importance are as follows:

Designing and planning influencing on health and safety planning and environmental conservation- Carrying over load by carrier- All plans and piles specifications approve before starting construction and operation by the engineer- Shift or cut off the flow of water, electricity, gas in place before starting the excavation.

The following is also important from the perspective of experts:

Designing and planning influencing on health and safety planning and environmental conservation- All plans and piles specifications approve before starting construction and operation by the engineer-Carrying over load by carrier-Maintain a minimum distance of three meters of high-voltage lines- Gas pipeline and conducted in accordance with relevant regulations by competent persons

From the perspective of people who experienced the following is important

Provide safe entry to workplaces- Care enough to prevent sliding, falling or probable loss of building materials discharged into public places- Having sufficient experience and physical ability needed by workers who work on sloping roofs- Avoid working in a position of danger, if there is

a risk of accident- Provide a sufficient number of fire extinguishers and training procedures to using them.

The basic elements of the existing weaknesses

According to studies, it can be concluded that the level of academic knowledge and engineering operation in the country is in good condition, but which is known as the weakness in urban construction is engineering management weaknesses and, the lack of systemic administration is the cause this problem. As construction accidents considered by a systemic view, a better understanding of the complex nature of the incidents and a more complete understanding of the factors causing it achieves. In the systemic vision, in addition to the direct causes of the accident, including physical, chemical, biological and ergonomic theory of the cause of the accident is expressed, in direct causes, which is very impressive also identify. Based on this research, the basic elements of weakness in the context of safety, health and environment in urban construction (West province) that can be applied to the entire country is examined. (mosalman *et al.*, 2007)

Lack of public awareness, health, safety and environmental protection in society in general (lack of belief)

If the issue of safety and environmental protection in society, viewed as fair and accurate, must be said that this place is not proper and expected for this important issue, in other words, the sensitivity in this regard are not cared enough and the general belief is usually considered banal. So basically Cannot expect improvement at the health and safety and environmental protection in different professions at this level of workplace culture, because workplace culture rooted in the culture of the society and its subsidiaries (alizade *et al.*, 2012)

Lack of in the construction sector

Safety process at existing construction sites systemic thinking has several important aspects which can regard Integration, proportionality and solidarity among the factors cited. Although technical affairs of constructing, including architectural design, structural design, mechanical and electrical engineering services, are quite systematic and usually accomplished comprehensively, but in

the implementation and monitoring of operations, engineering and construction management in the country, this systemic vision is not highlighting. For example, in the seven fields of engineering law and building control, instead of making integrate engineering services as a whole unit, it goes to separation and isolation. In such circumstances, the approach to the issue of health and safety and environmental protection in the construction is the same. A very none systemic vision, which includes agencies involved in the construction documents and construction operations and this none systemic thinking sometime seven cause health and safety and environmental protection to be forgotten or neglected.

Different systems for the urban construction

In Iran there are two basic system constructions and also some construction in the framework of the law and the independent construction applicable. Two of the country's major construction includes technical and administrative system and the construction of urban and rural. Technical and administrative system uses for civil development and other government projects.

The main feature of this system is the employer has a legal person, the government or some public agency's project and credit of the government budget. In the urban and rural construction, solely on the basis of building permits issued by the licensing authority building takes shape, Project employer may be natural or legal person, government or the private sector. Criteria and process projects in these two systems together is a great difference. There are several differences between the two systems, such as regulations and technical requirements, causing widespread damage and a lot of confusion among practitioner in the construction sector. The Occupational Health and Safety and environmental protection are also placed on the mentioned duality (sadeghifar *et al.*, 2004)

Generally, the construction sector, have basic differences with other sectors of industry, mining and services, so the planning and implementation of health measures, professional safety and protect the environment in the sector with other sectors, is also different. Some of these differences, the changing

nature of the workplace, and a variety of different procedures, multiple of human factors, human factors issues will fluctuate from various aspects such as culture, education, accommodation, etc. synchronization tasks, numerous and varied health conditions, safety and the environment, different workshops and construction projects, construction work in different workshops, specialty construction, different technologies, a variety of materials (type, maintenance, transport and use), a variety of machine tools. In such circumstances, relying solely on public health, safety and environmental protection is not enough and it should be a sub-specialized in designing and building engineering systems will be conducted. In the absence of such a subsystem, it's to be expected for different accidents.

Lack of knowledge management, project management and construction management

The most important issue in building engineering in the country, especially in urban and rural construction, is lack of knowledge and lack of management expertise and project management (project management expertise and proficiency in construction projects) and construction management in the sector. In all models investigating the causes of work-related accidents, the management is very important in preventing accidents. If that is indeed optimal management must plan and implement the requirements of health, safety and environmental protection as a priority that is considered most important. In traditional management, particularly by unqualified persons, knowledge management is not known and its practical methods is not used, and this is its major role in construction accidents (beige *et al.*, 2008)

Not using standard materials

In examining the causes of construction accidents, effects of Non-standard materials require special attention. In a construction accident, fire because of the non-standard polystyrene eleven lost their lives and large financial losses to the load. Asbestos Building adverse impact on individuals and it is quite clear today. However, there are non-standard materials, dangerous and hazardous to be used on building sites and improper storage method is used incorrectly and in all aspects of health, safety and the environment is damaged.

The large number of required documents (parallel, overlapping, inconsistent and shortcomings)

Iran is currently a shortage of required technical documentation to ensure the health, safety and environmental protection in the construction sector. The evidence is sufficient to meet these needs and unlike some people who seek to develop regulations pursuant to any accident, the real shortage is at implementation of these requirements. By analysis of the construction accidents of recent years, we can easily obtain the criterion or criteria required for construction to prevent any of these incidents have always existed, but has not been implemented and adhered to. The documents and evidence are not only low, but a number of drawbacks such as unnecessary and shortcomings of the text, parallel, overlapping and cause confusing, doubt and uncertainty (alizade *et al.*, 2012)

Lack of professional health inspections in the construction sector

Inspection of work for all jobs, including construction, manufacturing, mining and services is at the Ministry of Cooperatives, Labor and Social Welfare but professional health inspections is at the Ministry of Health and Medical Education. In the process, it can be seen that despite a large number of construction sites in the country, the number of Health inspector limited and some of them have to cover the large number of workshops, building inspectors, industrial, mining and services. According to the characteristics of the urban construction and its obvious differences with other sectors, it is necessary that the number of health inspections increase and more inspections took place in various stages of construction. In the other hand, the inspectors have been educated mostly unrelated to the construction, however, due to the specialized nature of the health, safety and environmental protection in the presence of labor inspectors and health professionals specialized in the construction sector is urgently needed (shibani *et al.*, 2011)

DISCUSSION

In light of the foregoing, the following points as a result of the proposal to increase the health, safety and environmental protection in the construction sector arises:

Development of systems thinking in the building

Systemic thinking in the building sector, can eliminating a large number of direct and indirect causes of construction accidents. Systemic vision at different levels involved in the construction of attention to health, safety and the environment enriches and improves the result.

Create a comprehensive system of construction as a single system in the country:

- Integration of different systems for the construction of the technical documentation required in many areas, especially, can be done easily, in addition to eliminating the duality and multiplicity of the system, plays an effective role in enhancing the quality and optimize the cost and timing of projects and the provision of health, safety and environmental protection in construction projects.
- Create a single entity responsible for the health, safety and environmental protection in the construction sector, reducing the centers involved in the decision-making and strengthen cooperation between them:
- Creating a single agency responsible for the health, safety and environmental protection construction is inevitable. This agency puts the homogenization methods, technical documentation and other activities related to health, safety and environmental protection in the construction sector and eliminate Parallel work and shortage of cooperation and coordination.
- Create a comprehensive system of security

and control of health, safety and environmental protection in the construction sector:

Due to differences with other parts of the building, design and implementation of such a system is needed, in this particular system measures to prevent construction accidents can be designed and implemented properly.

- Create professional inspection work and health in the construction sector:

Systemic vision to the health, safety and environmental protection in the construction sector, creating a system of labor inspection and health professionals specialized in the sector is inevitable. It will also have a significant impact in reducing work-related accidents.

- Strengthening sanctions and legal deterrence:

Revision of relevant laws and policies, and to exercise strong incentive law, on the commitment of the rule of law and strict observance of rules and regulations relating to health, safety and the environment provides. Culture, education and all other measures in the context of legalism and the rule of law becomes effective.

- Emphasis on the use of standard materials:

Require the use of building materials to the production cycle begins. If you prevent the production of non-standard materials, all materials will be standard equipment on the market and there is no concern about it, so we had witnessed the accident or illness from substandard materials

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