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Safety Climate Model toward Achieving Safety Performance in Construction Industry

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Abstract

The risk of construction industry makes it very important to pay more consideration of safety and improve safety performance. The main objective of this study will investigate construction worker perception associated with safety climate at construction sites. In addition, the relationship between safety climate and safety performance are explored. The research methodology is dependent on survey questionnaires focus on construction workers. A total of 190 questionnaires are distributed and the end of the number of valid answer is 180. Most of the safety climate factors have a good relationship towards achieving safety performance. Two models are developed to show the relationship between safety climate factors, along with the achievement of safety performance.

Key Words: Construction Industry, Safety Climate, Safety performance, Iraq.

INTRODUCTION

In general, construction objects are still probably the most dangerous and unsafe workplaces due to the fact of high occurrence of accidents (Teo, Ling, & Chong, 2005). Construction is dangerous because the industrial sector is most dangerous and unique nature. Safety has become a serious problem in the construction project. In the United States (US), construction industry paid 20% of death almost all jobs, any time they produced only 5 % of the United States ' workforce. In Kuwait, an account of the construction industry to get 42% of occupational deaths, in addition to Hong Kong industry accounts for more than one-third of all industrial accidents for the past ten years. Singapore, this particular construction industry occupies 29 % of the overall number of employees of the industry, however, the industry paid taking into account the imbalance by 40 % of injuries in the industry. These percent generally involve others indicating that this industry provides a poor record for safety performance (Chua & Goh, 2004). For developing countries, certainly, there should be efforts to increase the level of understanding among both employers and employees of the significance of wellness and safety in the projects. Many researches in developing countries have placed similar truth (Koehn et al. 1995, Kartam et al. 2000). The emphasis in both developed and developing countries to build the need can be put to the top of the exercise as well as the use of expanded safety program and courses (Koehn, Kothari, & Pan, 1995). Few researches have been done in safety of construction industry in Iraq according to publication studies distributed by country /region (Zhipeng, Yang, & Qiming, 2015).

This study is an effort to recognize the factors influencing the construction safety in Iraq and to provide a tool for assessing the safety of construction companies and accordingly improve it.

SAFETY CLIMATE AND SAFETY PERFORMANCE

Valuing and prioritizing safety (i.e., obtaining a positive protection climate) have been demonstrated to improve the performance of safety and reduce employee accidents (Zohar, 2002). The particular impact of SC on safety behavior of individual transferred to SP, known as the effective method (Fang et al, 2006). Many studies provided correlation evidence through recognized factors or dimensions, the SC measure with the performance of safety (Findley et. al, 2007). The climate of safety is generally regarded as a part of a company's climate; in the same way, SP is regarded as to be a sub system of company performance. Therefore, the SC could affect the performance of safety (Wu et. al, 2008).

Key Performance Indicators (PI) includes the advantage of determining weaknesses in practice safety instructions before they reveal as injuries (Mearns et al, 2003). In the case with the development of SC to get any effect on SP, in the case with this study must first make changes in knowledge (Neal et al. 2000). Mohammed (2002), produce model research depends on the hypothetical action safe work that has implications of the current SC environment at the construction site. Generally, SP measurement

techniques can be classified directly to behavioral measures, statistical measures, safety audit periodically and good balanced scorecard techniques. Guldenmund (2000) agreed that SC can be regarded as a surrogate indicator of SP. In fact, the concept as the power of safety placed upon the ability to estimate the performance on the safety project (Pousette et al. 2008).

By continuous observation and review of the SP regarding the construction industry, help to enhance safety system, to attain this, a (SC) model is a prerequisite.
A SC model should take into account SC factors, which are pertinent to an organization and its project. In this study, the prevalent factors of SC will be studied together with other factors such as safety training, job planning, program's policies, mutual trust, communication, safety and health programs/system activity, general contractor or subcontractor's construction managers.

FACTORS THAT EFFECT SAFETY CLIMATE AND SAFETY PERFORMANCE

Owner/client involvement: Typically the owner expectations regarding safety, the owner involves the schedule to support safety. The owner supports prevention through Design.

Leadership Involvement: Leaders tend to be visible for safety and give needed resources are included with producing safety goals along with metrics, in addition to, performance evaluation contains safety, etc.

Safety valued and aligned with production: Safety is appreciated equal to or perhaps higher than production, together with everyone in the company gives that answer coming from the top associated in the organization completely down, etc.

Management Commitment: Top management is determined to a discussed safety and health vision; management is determined to integrating safety, quality, and productivity.

Employee Involvement/Empowerment: Primary part for the team - involved and empowered in risk to safety assessment as well as pre-task planning, Effective safety committees, etc.

Communication: Continuously facilitated, Active engagement, Two-way of open communication, no filtering, no reprisal fear, Multilingual, Safety metrics visible along with shared with everyone, down, up, and extensive among hierarchy, peers, subcontractors, and colleagues. Experienced-to-inexperienced of peer communication, the early communicates wins throughout company.

Training/Education: The education offered to employees, supporting environment intended for training, continuous verification of training, ensuring that training is presented to all employees, and that training is evaluated correctly; Training contains workers and supervisors.

Mutual Trust: Fair treatment and consistent response, Transparent flow and free of information, not any fear of recrimination, workers trust that supervisors tend not to dismiss health and safety, workers trust supervisors to perform what they say these workers will do, in order to back them up to any time they are right, as well as to tell them whenever they are performing something wrong.

Job Planning: Safety needs involvement throughout the planning of the construction phases.

Programs, Policies, Practices, and Procedures: Safety systems tend to be institutionalized and established, policies and programs present commitment to safety practices, and policies support safety and health.

The Programs of Safety and Health: The program or system of Safety and Health is obviously defined, as well as it is uniformly applied and enforced. This is communicated for workers, and that provides appropriate safety training to workers. These are aggressive, not reactive, Normal audits with obvious action plans are utilized, there are obvious learning indications as part of accountability, and this also concentrates on near misses. The item encourages employee participation.

Construction Manager and General Contractor Subcontractors' Management: The CM/GC set's safety targets with subcontractors, Involves safety in choosing subcontractors, empowers/Communicates subs on safety, Generates pride as well as provides adequate resources pertaining to safety.

METHODOLOGY

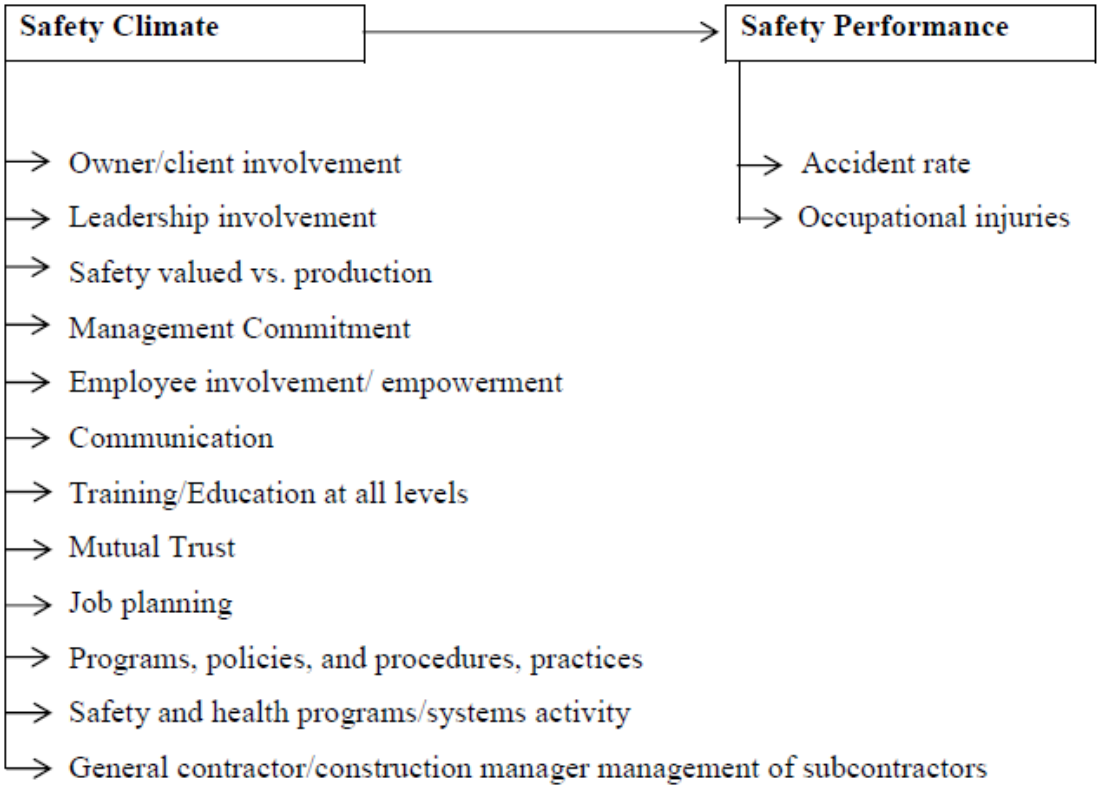
This study employs quantitative techniques to explore the factors that affect worker safety performance for construction companies in Iraq. The study involves the collection and analysis of quantitative data correlated to the construction companies search for support for the outcomes of the quantitative data analysis and to recognize additional factors that are not discovered.

The sample for this research is assessed by the method given by V. Krejcie and W. Morgan (1970) that is 190 out of 375 (Krejcie & Morgan, 1970). The information from this survey was gathered through self-administrated questionnaires. All the respondents had required to rate the questions in part 3 using five-point Likert- scale ranging from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

Research Model

The aim of building this model is to examine the effect of safety climate factors on safety performance in the construction industry and to discover the kind of relation by test the direct relation between them then determine the group of factors that has the highest influence on safety climate of contractors industry.

Figure 1. Research Model



RESULTS

The first linear regression testing is between safety climate and accident rate. From the analysis of respondents answered, strongly agreed regarding the existing of the relationship Owner/Client involvement (-0.226), Leadership involvement (-0.253), Safety valued vs. Production (-0.156), Management Commitment (-0.165), Communication (-0.155), Training /Education (-0.193), Mutual Trust (-0.202), Safety and Health Programs (-0.155), General contractor/construction manager management of subcontractors (-0.153) towards Accident Rate. The relationship is observed to be statistically significant. On the other hand, the relationship Empowerment (0.076), Job Planning (0.047), and Programs, Polices, Procedure and Practices (-0.048) towards Accident Rate were not supported. Therefore, the research hypothesis first is partially accepted.

The second linear regression testing is between safety climate factors and occupational injuries. From the analysis of respondents answered, strongly agreed regarding the existing of the relationship Owner/Client involvement (-0.285), Leadership involvement (-0.343), Safety valued vs. Production (-0.157), Management Commitment (-0.226), Communication (-0.237), Training/Education at all level (-0.258), Programs, Polices, Procedures and Practices (-0.159), Safety and Health Programs (-0.161), General contractor/ construction manager management of subcontractor (-0.157) towards

Occupational injuries. The relationship is observed to be statistically significant. On the other hand, the relationship Employee involvement Empowerment (0.069), Mutual Trust (-0.139), and Job Planning (0.076) towards Occupational injuries were not supported. Therefore, the research hypothesis second is partially accepted.

Figure 2. Model of Safety Climate Factors with Accident Rate

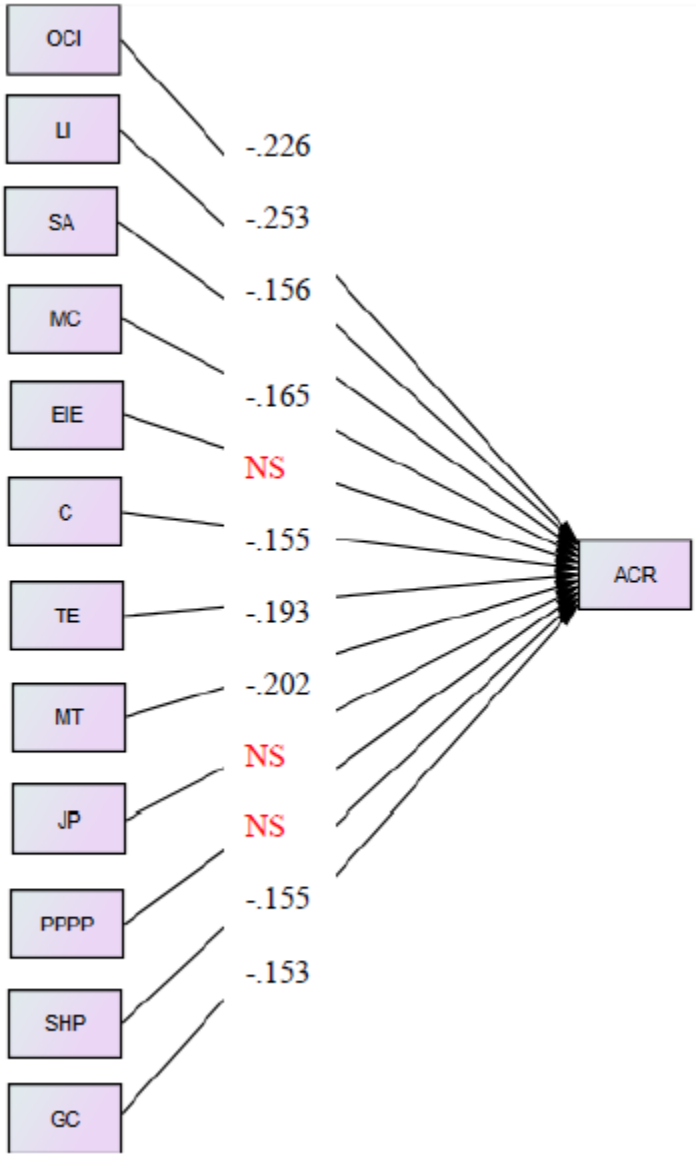
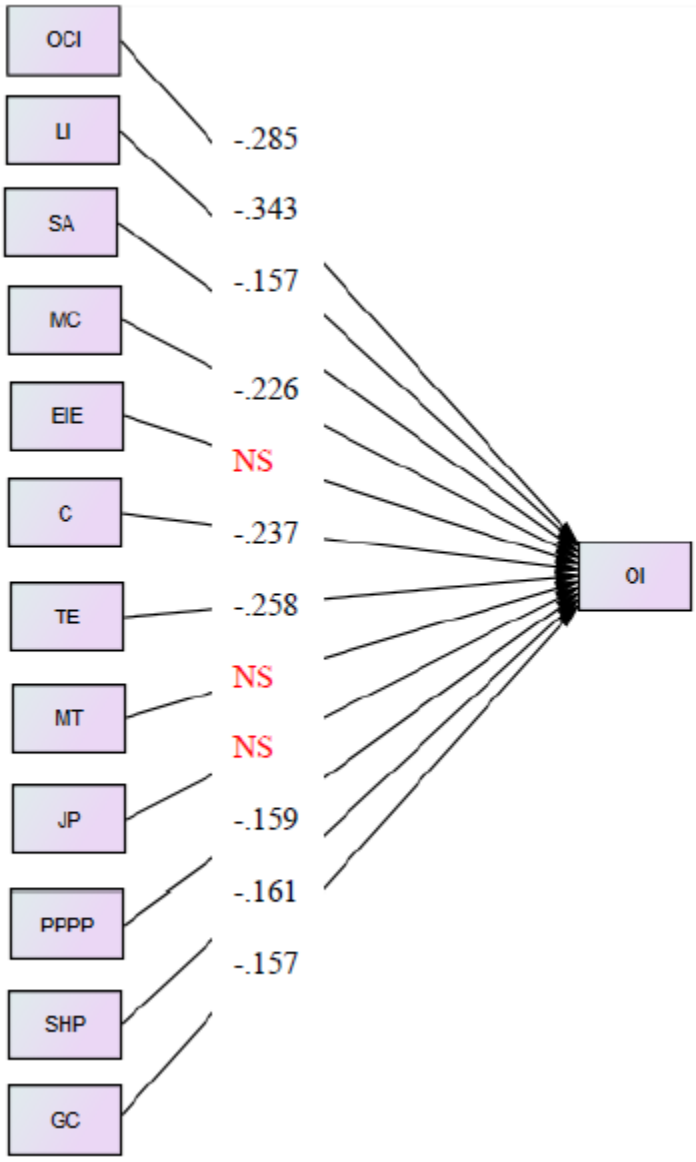


Figure 3. Model of Safety Climate Factors with Occupational Injuries



Note: Owner/Client Involvement = OCI, Leadership Involvement = LI, Safety valued vs. Production = SA, Management Commitment = MC, Accident rate= ACR, Employee involvement/empowerment = EIE, Communication = C, Training/Education = TE, Mutual Trust = MT, Job Planning = JP, Programs, Polices, Procedures and Practices = PPPP, Safety and Health Programs = SHP, General contractor/ construction manager management of subcontractor = GC, Occupational injuries = OI

CONCLUSION

This study confirms that the relationship between SC and SP in the construction Company in Iraq with the decision of the majority of the material. There was variation

among the results, depending on which this study could show the direct impact climate factors dimension safety is currently being tested, on safety performance. These results support the idea. Reason for integrating the SC with SP because it supports human factors controlled by human error, and reaches a maximum level of safety, it appears the role of management practices that are also a key factor in achieving safety performance. Human factors and management practices if working in one direction for the organization can achieve better safety performance. This safety performance can affect the behavior of employees to prevent accidents.

Safety devices developed for this study can be regarded as practical techniques to evaluate and improve the safety performance with the company. This is used to compare the company's safety performance and practice with the different construction company in order to identify areas that need to be considered to enhance safety at construction sites.

The resultant measures individual attitudes and perception of safety and organizational behaviors (including commitment management, leadership involvement, owner/client involvement, safety valued aligned with production, safety and health program (safety activity) and construction manager. That found during this study and success SC to evaluate SP needed from organization to develop action plans for continuous improvement of SC, where everyone in the organization needs to participate in some safety activates to support the process or improve the aspect of safety. Based upon the conclusions determined earlier, and the results attained from this study, the following points can certainly be highly recommended:

- There is a need from the responsible authority to develop to the "Full safety programs" and enforce applying them.
- Therefore, there is a need from the responsible authority to enforce the training for safety.
- It is recommended to study the safety outcomes, by trying to reach recorded data if available to get findings that are more accurate.
- Encourage the companies to record accident data to improve their safety, in the future.
- Prominences should be done on investigation the indirect costs of accidents. These costs in addition of being greater than the direct costs, which usually covered by insurance, they buried into project costs, increasing the cost of construction. The costs of accidents present a serious drain of company’s profit. Therefore, more attention must be paid to the costs of accidents are higher than the cost of safety.
- The government together with the engineering societies need to show a significant role to use the safety rules by issuing the regulations, codes, standards and legally enforced the companies to follow them with adequate strict penalties for noncompliance.

- Research could be conducted to estimate the safety cost and to correlate this kind of cost with the accidents cost to encourage the organizations to consider safety seriously.
- Future studies may focus on bigger companies if any exist.
- Future studies may investigate; to any level, safety programs adopted in companies to locate or specify the word "Partial Safety Program."
- We recommended directing the future studies to target the workers, because this study biased to the layer of engineers and managers.

REFERENCES

Chua, D. K., & Goh, Y. M. (2004). Incident Causation Model for Improving Feedback of Safety Knowledge. Journal of Construction Engineering and Management, 130(4), pp. 542-551.

Fang, D., Chen, Y., & Wong, L. (2006). Safety climate in construction industry: A case study in Hong Kong. J. Construction Engineering and Management, 132(6), pp. 573-584.

Findley, M., Smith, S., Gorski, J., & O'neil, M. (2007). Safety climate differences among job positions in a nuclear decommissioning and demolition industry: Employees' self-reported safety attitudes and perceptions. Safety Science, 45, pp. 875–889.

Guldenmund, F. (2000). The Nature of Safety Culture: A Review of Theory and Research. Safety Science, 34, pp. 215-257.

Kartam, N.A. and Bouz, R.G. (1998) Fatalities and Injuries in Kuwait Construction Industry.

Koehn, E., Kothari, R. K., & Pan, C.-S. (1995). Safety in Developing Countries: Professional and Bureaucratic Problems. Journal of Construction Engineering and Management, 121(3), pp. 261-265.

Mearns, K., Whitaker, S. M., & Flin, R. (2003). Safety climate, safety management practice and safety performance in offshore environments. Safety Science, 41, pp. 641-680.

Mohamed, S. (2002). Safety Climate in Construction Site Environment. Journal of Costruction Engineering and Management, 128(5), pp. 375-384.

Morgan, D. L. (2006). Practical Strategies for Combining Quantitative and Quantitative Methods:Applications to Health Research. In Emergent Methods in Social Research (pp. 165-182). London, Sage Publications Inc.

Neal, A., & Griffin, M. A. (2000). A Framework for Linking Safety Climate to Safety Performance, Knowledge, and Motivation. Journal of Occupational Health Psychology, 5(3), pp. 347-358.

Pousette, A., Larson, S., & Torner, M. (2008). Safety climate cross-validation, strength and prediction of safety behaviour. Safety Science, 46(3), pp. 398-404.

Teo, E. A., Ling, F. T., & Chong, A. F. (2005). Framework for Project Managers to Manage Construction Safety. International Journal of Project Management, 23(4), pp. 329-341.

Wu, T. C., Chen, C. H., & Li, C. C. (2008). A correlation among safety leadership, safety climate and safety performance. Journal of Loss Prevention in the Process Industries, 2, pp. 307-318.

Zohar, D. (2002). Modifying supervisory practices to improve subunit safety: A leadership-based intervention model. Journal of Applied Psychology, 87, p. 156−163.

Zhipeng, Z., Yang, M., Qiming, L. (2015). Overview and analysis of safety management studies in the construction industry. Journal of Safety Science, 72, pp.337-350.