FACTORS THAT INFLUENCE SAFETY CLIMATE IN CONSTRUCTION IN OMAN

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The safety climate on a specific construction project refers to managers' and workers' shared perceptions of the adequacy of the safety and health programmes and the consistency between the organization's espoused safety policies/procedures and the actual conditions at the job site. A mature safety climate and a rich safety culture contribute to achieve a safe workplace. This paper aims to explore and to make explicit some of the key factors / dimensions that have a high influence and need to be considered for the assessment of the maturity level of safety climate. The concept of safety climate is firstly discussed with a review of different safety climate factors from the published literature. The results of the interviews with the construction managers of selected construction companies in Oman that exhibit high level of safety performance are reported. The objective of this research work is to find out which safety climate factors will be relevant to construction organizations in Oman that will need to be considered for assessment and could be helpful to make different plans to achieve the required level of maturity. The results show that Management Commitment, Aligning and Integrating Safety as a Value, Accountability at all Levels, Supervisory Leadership, Empowering and Involving Workers, Improving Communication, and Training at all Levels are some of the key factors that highly influence safety climate in Oman. Since this is the initial finding of the semi structured interview involving six experienced construction professional, representing top management, further research is recommended to be conducted by giving an opportunity to other members of construction team (site supervisors, skill workers and labours) to express their views of safety climate leading factors.

Keywords: Safety Climate, Construction, Assessment, Safety Performance, Qualitative approach

INTRODUCTION

Statistics published by the International Labor Organization (2015) indicates that at least 108,000 workers are killed on construction site every year, a figure which

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represents about 30 percent of all occupational fatal injuries. Data from a number of industrialized countries show that construction workers are 3 to 4 times more likely than other workers to die from accidents at work. In the developing world, the risks associated with construction work may be 3 to 6 times greater (ILO, 2015). Many more workers suffer and die from occupational diseases arising from past exposure to dangerous substances, such as asbestos. Construction is one of the world's biggest industrial sectors, including the building, civil engineering, demolition and maintenance industries. It accounts for a large proportion of GDP for many countries for example, 10 percent in the U.K., 17 percent in Japan, and 10 percent in Oman. Statistics published in the daily Times of Oman dated June 09, 2014, noted that a total of 723,000 residents were working in the construction industry. The ongoing and planned development projects in different sectors, including construction, for financial year 2015-2016 is shown in figure 1. The construction sector projects stand out as the largest one, amounting to US$ 43.16 Billion. According to the budget report, spending on development projects are estimated at US$ 3.12 Billion (OMR1.2 Billion), representing the amount to be paid during the year 2017, as the actual work progresses (ToM, 2017).

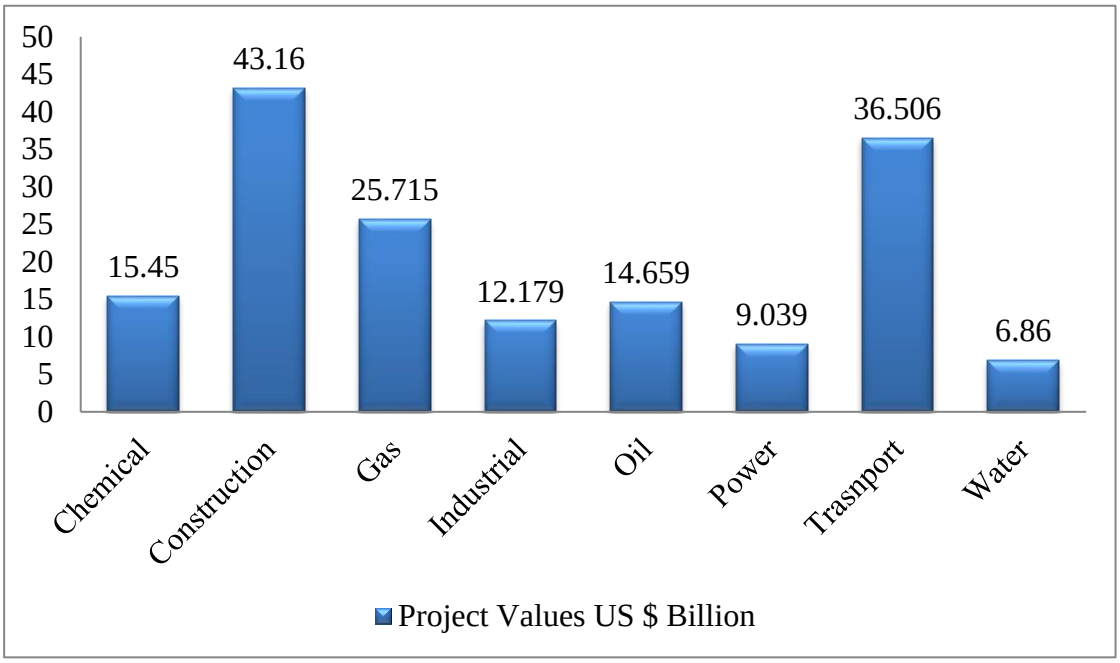

Figure 1. Values of Ongoing and Planned Projects in Different Sectors of Oman (Deloitte 2015)

In most developing countries, construction is among the fastest growing areas of the labor market, continuing to provide a traditional entry point for laborers. It is, however, one of the most dangerous industries. Construction workers build, repair, maintain, renovate and demolish houses, office buildings, factories, hospitals, roads, bridges, tunnels, stadiums, docks, airports and more. During the course of their work they are exposed to a wide variety of hazards on the job, including dusts and vapours, asbestos, awkward working positions, heavy loads, adverse weather conditions, work at heights, noise, vibration from tools, among many others. The causes of accidents and ill-health in the sector are well known and almost all are preventable (ILO, 2015). A report published in the daily Times of Oman dated February 28, 2015 states that there are no official statistics of how many company workers get hurt in the course of their duties but according to the individual Health and Safety Environment's records

of top 10 contractors, more than 3,700 of them needed medical treatment in 2014. The injured workers who get hospitalized made up nearly 10 per cent of the total workers on this list. Sadly, about 18 per cent of them died either at the sites or in hospitals in 2015. In comparison to the previous year, 246 more workers got injured in 2014 but for obvious reason, company directors do not want this part of the record to be made public.

In construction organizations in Oman, most of the workers are foreigners (92% of total workforce) and as such they are not insured under the government authority (NCSI, 2015). As per law of the country, construction organizations are required to seek private insurance for their workers; however as the risk associated with construction workers is high their insurance premium is comparatively more. Construction organizations further bear high cost at the time of recruitment and pay for repatriation, compensation and replacement in case of accidents involving injuries and death. There is potential for construction organizations to reduce the cost associated with accidents either direct, or indirect, by improving safety culture through safety climate.

In recent years the awareness of the importance for safety performance of organizational, managerial and social factors, has increased. Safety climate is a subset of organizational climate offers a route to safety management, complementing the often predominant engineering approach. An understanding of the safety climate dimensions can be useful in improving the safety performance of an organization. In addition, safety climate investigations are more sensitive (e.g. multi-faceted) and are proactive bases for developing safety, rather than reactive (after the fact) information from accident rates and accident and incident reports (Seo et al., 2004). Over the past century, the focus on factors influencing safety and safety improvements within industries has changed. Hale and Hovden (1998) describe three ages of safety: the technical age (1920's), the human factor age (1970's) and the management system age (1980's). The third wave or age of safety expanded the focus to include safety culture, and the concept of safety culture was first truly introduced and defined after the Chernobyl accident in 1986 (INSAG, 1992). Safety culture; and safety climate are concepts that today attract much attention across a broad number of industries and sectors (Clarke, 2000). One of the reasons for this is that a rich safety culture and a mature safety climate are some of the most important factors in achieving a safe workplace (Bergh et al 2013). In order to improve the level of safety culture and safety climate it is important to: a) determine the current level of safety culture and safety climate, b) decide what level of safety culture and safety climate is needed, attainable and wanted, and c) to create a plan to achieve the safety culture and safety climate that is wanted (AIChE, 2012).

Safety climate may be defined as shared perceptions among the members of a social unit, of policies, procedures and practices related to safety in the organization ((Kines, et al 2011). The Centre for Construction Research and Training (CPWR) defined safety climate as workgroup members' shared perceptions of management and workgroup safety related policies, procedures and practices (CPWR, 2014). Researchers and practitioners have identified safety culture and safety climate as key to reducing injuries, illnesses and fatalities on construction worksites (appendix I). Many construction contractors are trying to improve these indicators as a way to move closer to a goal of achieving zero injury worksites. This paper presents the initial research of how different safety climate could be used by construction organizations to improve their safety performance. The Nordic occupational safety climate

questionnaire was developed in the year 2011 has 50 questions on the following dimensions (Kines, et al 2011).

-Management safety priority, commitment, and competence

-Management safety empowerment

- Management safety justice

-Workers' safety commitment

-Workers' safety priority and risk non-acceptance

-Safety communication, learning, and trust in co-workers safety competence

-Trust in the efficacy of safety systems

LITERATURE REVIEW

In terms of safety performance the construction industry in Oman is not as advanced as the UK and USA, therefore it is anticipated that the cost associated with this industry could be comparatively more. An internet based search covering six months (May 2015 to November 2015) of one daily newspaper shows that nine construction workers were killed and twenty five were injured in Oman at different construction sites. These were major accidents in construction sites located in cities therefore they were published in the newspapers. There could be accidents happened in construction sites which were not reported because it may happened in a remote area or the accidents were minor, involving less casualties and injuries. The costs of accidents in construction in Oman reported by Umar and Wamuziri (2016 a), is estimated at US$3.237 billion (based on the total value of construction projects) while the compensation costs are approximately US$3·74 million/year. There are challenges for safety in construction in Oman, but opportunities do exist. Safety regulatory organizations such as Occupational Safety and Health Administration (OSHA) in USA and Health and Safety Executive (HSE) in UK have significantly played their roles in improving the safety performance in their jurisdictions. Statistics indicates that Worker deaths in America are down on average, from about 38 deaths a day in 1970 to 12 a day in 2014. The number of worker injuries and illnesses is down from 10.9 incidents per 100 workers in 1972 to 3.3 per 100 in 2013 (OSHA, 2014). The national frame work for safety improvement in Oman presented by Umar and Wamuziri (2016 b) involves all the stakeholders under a regulatory organization as shown in figure 2. There were debates that small and medium construction organizations have none or very low capabilitity and financial benefits for improved safety performance. Research conducted in the UK on cost and benefit analysis revealed that when total costs of accident prevention were compared to the total benefits of accident prevention, the benefits far outweigh the costs of accident prevention by a ratio of approximately 3:1, which means that when contractors, irrespective of their sizes, spend £1.00 on accident prevention, they gain £3.00 (Ikpe et al 2012). The process of using safety climate factors to improve safety performance is shown in figure 3 (Umar and Wamuziri 2016 c).

To identify the safety climate factors relevant for safety performance, an internet search using the key words "safety climate factors" and "safety climate assessment tool" has been conducted. The selected search period was from 1980 to 2011. A total of twelve safety climate assessment tools obtained by this search have been complied

with full details as shown in appendix I. Briefly, the number of assessment tools found through internet search was one in each year 1980, 1991, 1997, 2000, 2004, 2005, 2006, 2008 and 2010; while there were three tools found in 2011. The number of leading safety climate factors used in these assessment tools was 55.

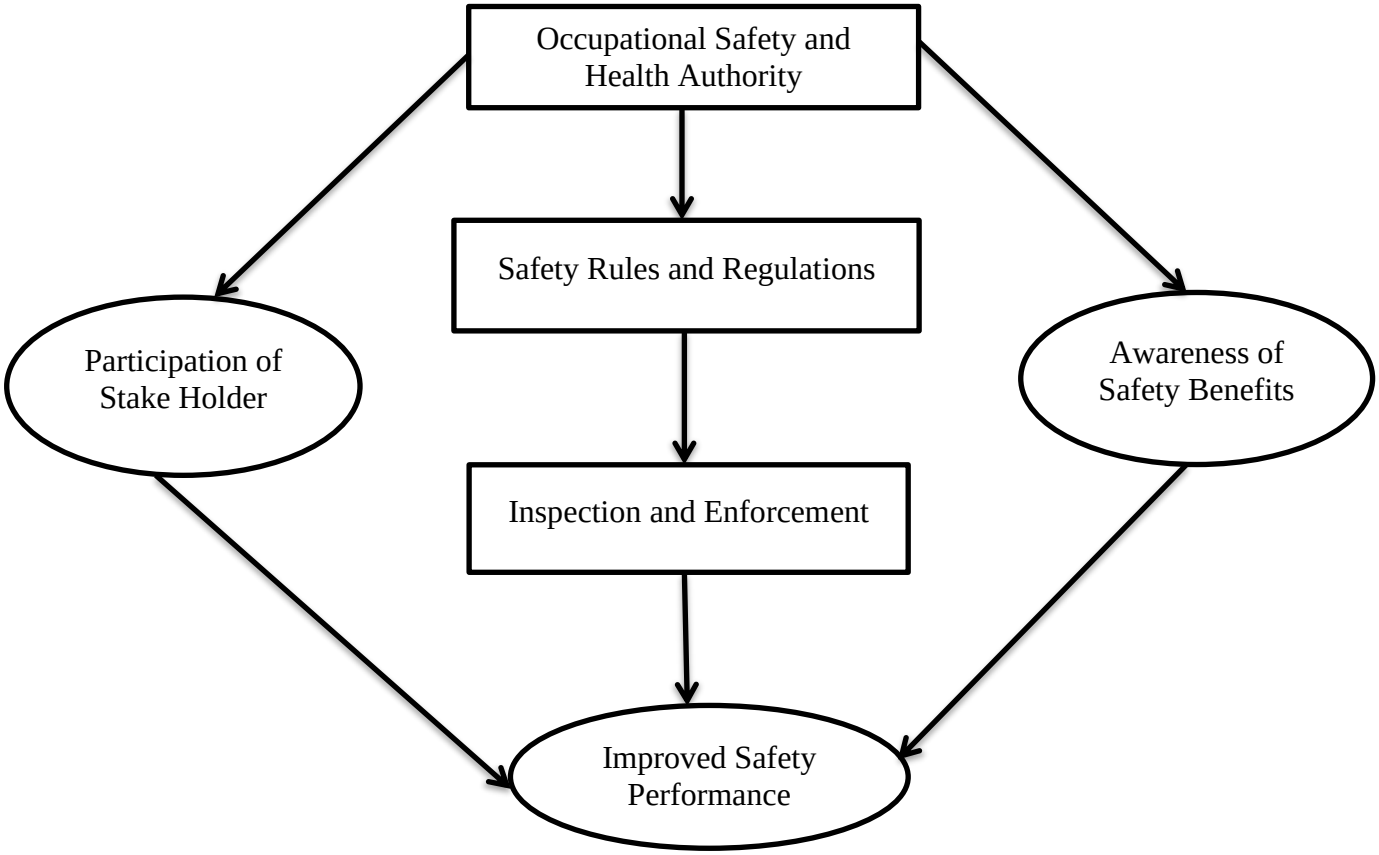

Figure 2. Safety Model for Construction (Umar and Wamuziri 2016 b)

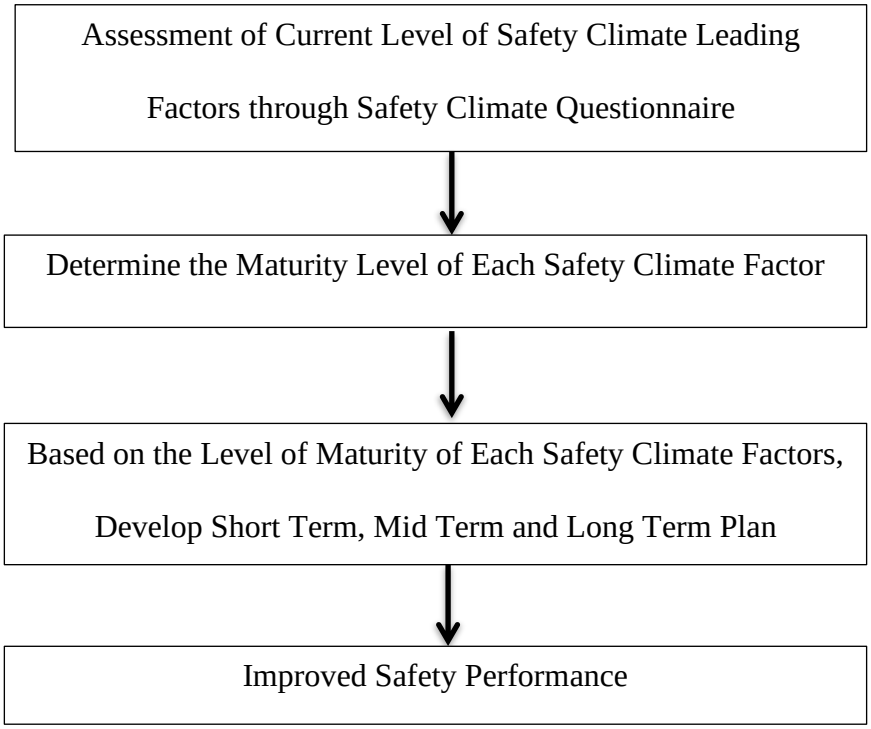

Figure 3. Process of Using Safety Climate to Improve Safety Performance (Umar and Wamuziri 2016 c)

This led the authors to proceed with their research and to evaluate which factors will be more relevant for an assessment tool to be used in Oman for safety improvement.

RESEARCH AIM AND METHODOLOGY

The overall aim of this study is to evaluate the safety climate factors which can influence the safety climate in construction in Oman. Apart from this the authors also wanted to solicit the views of construction professionals in Oman on the relevance of a safety climate approach for safety improvement in Oman. In order to achieve this objective, a qualitative approach as opposed to a quantitative approach, was employed in the study. Briefly, the distinction between these two research strategies is as follows. Quantitative research emphasises quantification in the collection and analysis of data. It takes a deductive approach to the relationship between theory and research and emphasis is placed on the testing of theories. Quantitative research incorporates the norms and practices of the natural scientific model and positivism. It views social reality as an external objective reality.

On the other hand, a qualitative research strategy puts emphasis on words and meanings rather than quantification in data collection. It emphasises an inductive approach in the relationship between theory and research and emphasis is placed on the generation of theories. Research can however combine both qualitative and qualitative approaches – a strategy increasingly referred to in the literature as mixed methods research (Wamuziri 2013). Since the research reported in this paper is exploratory in nature, a qualitative enquiry was deemed to be the most appropriate approach to data collection. Semi-structured interviews were used to collect relevant information and the interview guide or set of questions used for the research are

shown in the appendix II. The interview process was flexible and the emphasis was on how the interviewees understood the concept of safety climate for improved safety performance.

The interviewees were selected on a purposive sampling basis. Such sampling is strategic in nature and the philosophy or idea was to interview respondents who were relevant to the research questions. This was achieved by interviewing a total of six senior managers from leading construction contractors in Oman. Managers operating at a senior level with safety responsibilities in construction organizations were considered best placed to provide descriptions of the real world with respect to the safety climate factors. The characteristics of the interviewees are presented here.

a) Interviewee one: A senior engineer in a construction organization mainly working in the transportation sector in Oman having more than 20 years of project management experience in highway sector. The company in Oman was initially established in 1973.

b) Interviewee two: A senior project engineer in construction organization working in the housing sector in Oman, with more than 25 years of experience of project management in building sector. The organization was initially established in 1972 and currently registered as excellent grade company in Oman.

c) Interviewee three: A senior construction manager with over 10 years of experience in one of the major construction companies with offices in all Gulf Cooperation Council (GCC) countries. The company is 100% privately owned with more than 1000 employees in Oman. The interviewee is currently working as project director of a highway construction project with an estimated cost of US $ 305.90 million.

d) Interviewee four: A senior construction manager with over 12 years of experience in one of the main construction companies. The Organization was established in the year 1992 and currently executing some of the main buildings projects pertaining to government and private sector in Oman. The construction manager interviewed from this organization is working on a construction project of an estimated cost of US $ 60 million.

e) Interviewee five: A senior contract manager with over 15 years of experience in one of the world leading consulting organizations having offices in USA, Europe and Middle East. The organization was Founded in 1944, and 100% owned by the employee stock ownership trust with a total revenues of $3.2 billion in 2015.

f) Interviewee six: A senior design consultant with more than 8 years of experience in one of the leading international consultants operating the Middle East, Africa, Asia, and Europe with more than 10,000 staff. The interviewee is currently involved as design and supervision consultant in some of the mega road projects in Oman.

The use of semi-structured interviews in data collection offers the following strengths.

(a) It enables the researcher to examine the level of understanding that a respondent has about a particular topic – usually in slightly more depth than is possible with a postal questionnaire.

(b) It can be used as a powerful form of preliminary assessment. That is, it can be used to explore how a respondent feels about a particular topic before using a second method such as participant observation or in depth interviewing to gather greater depth of information. Semi-structured interviews can also be used to identify

respondents whose views may be explored in more detail through the use of focus groups.

(c) All respondents are asked most of the questions in the same way. This makes it easy to repeat or replicate the interview. In other words, this type of research method is easy to standardise.

(d) Provides a reliable source of data.

(e) The researcher can contact reasonable numbers of people quickly, easily and efficiently.

The approach however suffers from a number of weaknesses and limitations including the following items.

(a) It can be time consuming if the sample group is very large. This is because the researcher or their representative needs to be present during the delivery of the semi-structured interview.

(b) The quality and usefulness of the information is highly dependent upon the quality of the questions asked.

(c) A substantial amount of pre-planning is required.

(d) The format of questionnaire design makes it difficult for the researcher to examine complex issues and opinions. Even where open-ended questions are used, the depth of the answers that the respondent can provide tends to be more limited than with other qualitative methods.

Despite these limitations, the six respondents in this study provided a rich source of vital information which will be useful in further in-depth investigations on the subject.

In the next section, the results obtained through the interview process are assessed and evaluated.

ANALYSIS AND DISCUSSION OF RESULTS

Effectiveness of Safety Climate for Safety Improvement

All the interviewees agreed that safety climate approach can be useful for enhancing the safety performance of construction organizations in Oman. All interviewees agreed that an understanding of the safety climate approach and using the appropriate safety climate dimensions and factors can lead the construction organizations towards improved safety performance. Interviewee two and three however mentioned that safety is something which responsibility cannot put only on the construction organizations. Interviewee three stressed on the safety inspections by external regulatory organization. He stated that effective health and safety regulations and their implementation across construction organizations are very improvement to expect the maximum safety performance. Interviewees four and five mentioned that although safety is everyone's responsibility, however low safety performance and increased number of accidents are not in the interest of contractors as they are the one who are affected by this. Safety climate approach for safety improvement can be one solution which can lead construction organization to improve their performance in safety. Interviewee six stated that construction organizations have the liberty to adopt any of the approach which can improve their safety performance. Since safety climate is used

in different regions worldwide, it can be equally effective in Oman as well and construction organizations need to get benefits from this approach.

Safety Climate Factors

All interviewees were of the view that a rich safety culture can be achieved through a mature safety climate. However their views on safety climate factors were different when asked with the question on different dimensions or factors that would need to be considered to achieve a mature safety climate and rich safety culture in construction organizations in Oman. They agreed that construction organizations in Oman need to adopt the concept of improving safety culture and safety climate to improve their safety performance. Interviewee one stated the safety training, management commitment and competence for safety and effective safety communication are the key element of a rich safety culture and as such need to be considered as safety climate factors. Interviewees two and three views on safety climate factors were almost the same. They noted that personal commitment towards safety has significant impact on safety outcome. Therefore personal safety commitment and knowledge of safety are some of the important factors that will influence safety culture and safety climate. Interviewee three however did mention the safety empowerment and stated that workers need to have the right of non-acceptance of risk. Interviewee four highlighted the importance of accountability for safety through active monitoring and enforcing. He stated that safety compliance is important towards a safe work environment and therefore, there has to be a system which ensures that safety is not compromised at any level. The workers must have on job safety training or at least safety briefing before taking a specific work and task. Interviewee five stated that the main factor which can lead towards an improved safe work place is management involvement in safety. How much safety is important to management and how much they are committed towards safety is a key element. Other elements, apart from management commitment which need to be considered are safety communication on site, training of workers and motivation and behaviour of workers. He stressed that although personal safety comes first, workers need a level of motivation to ensure co-workers safety as well is very important in achieving a safety working environment. Interviewee six stated that the factors which can lead a construction organization towards an improved safety performance are related individual and organization. Individual factors are motivation, behaviour, knowledge and non-acceptance of risk; while organizational factors are commitment and compliance of safety, training, accountability and effective communication of safety related thing.

Safety Climate Assessment Tool

From the literature review, the authors came across different forms of safety climate tools. Although the significant item in these tools is the set of factors which were used in these tools for assessment. In the study, an opportunity was given to the interviewees to express their view on the possible format of such tools if developed for construction organizations in Oman. All the interviewees agreed that they are not using any such tool for the assessment of their safety culture and safety climate. Interviewees two and five did mention that they normally use the accidents analysis to identify the root causes of accidents and to develop strategies to avoid such accidents in future. Interviewee five mentioned that if the accident has taken place because of the worker knowledge, then they incorporate the appropriate training to avoid such

accident in future. All interviewees agreed that the leading safety climate factors need to be measured on a scoring scale of 1-5 (strongly agreed – strongly disagreed). Interviewee one stated that there is no need to give an option for neutral in the scoring of any leading safety climate factor and the scale can be from 1-4 (strongly agreed – strongly disagreed). Interviewee three mentioned that such questionnaire needs to be in multi-language to effectively serve the diverse construction industry in Oman. Interviewee six mentioned the use of technology tools for using such questionnaire instead of paper's based approach.

Effectiveness of Safety Climate Assessment Tool

Although safety climate assessment tools are successfully used in the different industries including construction worldwide, however the authors were interested to know the views of construction industry professionals in Oman of their effectiveness. All interviewees agreed that a safety climate assessment tool which will allow construction organizations in Oman to assess their level of safety culture and safety climate will be helpful to improve the safety performance of construction organizations. Interviewee two mentioned that construction organizations should have sufficient knowledge of such tools before they use it properly and get full benefits from it. Interviewee one, three and five stated that it is possible for all sizes of construction organizations to prepare their plans for safety improvement through the results of safety climate assessment, however small construction organizations can face financial and technical issue because of their capacity to implement such plans. Small construction organizations will need to have some external support to implement such plans to achieve the required level of maturity for any safety climate dimension.

CONCLUSIONS

This article represents the research in progress on using safety climate approach to improve the safety performance of construction organizations in Oman. The literature review indicates that this approach has been used in different projects worldwide to assess and improve the leading safety climate factors which results in improved safety performance. The results of semi structured interview with construction professionals working in Oman show that their organizations are currently not using this approach. The overall aim of this study was to evaluate the safety climate factors which can influence the safety climate in construction in Oman. Interviewees identified several factors which could have a high level of influence on safety climate including management commitment, aligning and integrating safety as a value, accountability at all levels, supervisory leadership, empowering and involving workers, improving communication, and training at all levels. This research is based on the views of six construction professionals working as top manager in their construction organization. The construction team of any organization is composed of managers, supervisor, skill worker and labours, therefore their views of different safety climate need to be taken into account before proposing any assessment tool. This could be achieved through a quantitative research using a structured questionnaire. The collected data could be subjected to statistical test and be evaluated with the result of this study in proposing the main safety climate factors relevant to Oman construction industry.

APPENDICIES

APPENDIX I				
S.No.	Name of tool or survey Author Source	Used in Construction?	Number of Questions	Number and Name of Included Dimensions/ Factors
01	Institute of Work & Health 2011 Benchmarking Organizational Leading Indicators for the Prevention and Management of Injuries and Illnesses: Final Report. http://www.iwh.on.ca/benchmarking-organizational-leading-indicators	Utilities	8	-Not divided into factors -Leading indicator tool developed for Ontario workplaces
02	Dedobbeleer & Beland 1991 A safety climate measure for construction sites. Journal of Safety Research 22(2): 97-103 http://www.sciencedirect.com/science/article/pii/002243759190017P	Yes	9	2 -Management commitment -Worker involvement
03	DeArmond et al. 2011 Individual safety performance in the construction industry: Development and validation of two short scales. Accident Analysis and Prevention 43 (948–954)	yes	10	2 -Safety compliance -Safety participation

	http://www.sciencedirect.com/science/article/pii/S0001457510003647			
04	Zohar & Luria, 2005 A Multilevel Model of Safety Climate: Cross-Level Relationships Between Organization and Group-Level Climates. Journal of Applied Psychology 2005, Vol. 90, No. 4, 616–628 http://psycnet.apa.org/journals/apl/90/4/616.html	yes	16	6 3 Organizational Level -Active practices (monitoring, enforcing) -Proactive practices (promoting learning, development) -Declarative practices (declaring, informing) 3 Group Level -Active practices (Monitoring, controlling) -Proactive practices (Instructing, Guiding) -Declarative practices (Declaring, Informing)
05	Parker et al, 2006 A framework for understanding the development of organizational safety culture. Safety Science 44 (2006) 551 562 http://www.sciencedirect.com/science/article/pii/S0925753505001219	No (oil industry)	18	Uses 5 descriptions (text-based rubrics) reflecting level of organizational safety culture maturity Descriptions divided into two categories: - Concrete organizational aspects

				-Abstract organizational concepts
06	Seo et al. 2004 A cross-validation of safety climate scale using confirmatory factor analytic approach. Journal of Safety Research 35 (2004) 427– 445 http://www.sciencedirect.com/science/article/pii/S0022437504000817	No	30	5 - Management commitment to safety - Supervisor safety support - Coworker safety support - Employee participation in safety-related decision making and activities -Competence level of employees with regard to safety
07	Pousette et al. 2008 Safety climate cross-validation, strength and prediction of safety behavior. Safety Science 46 (2008) 398–404 http://www.sciencedirect.com/science/article/pii/S0925753507000926	Yes Swedish tunnel workers	33	4 -Management safety priority - Safety management - Safety communication -Workgroup safety involvement
08	Neal, Griffin & Hart 2000 The impact of organizational climate on safety climate and individual behavior. Safety Science, 34, 99-109, 2000 http://www.sciencedirect.com/science/article/pii/S0925753500000084	Yes but not published	35	8 - Management values - Communication - Training -Physical Work Environment - Safety Systems - Knowledge

				- Motivation - Behavior
09	Zohar, 1980 Safety Climate in Industrial Organizations: Theoretical and Applied Implications Journal of Applied Psychology 1980, Vol. 65, No. 1, 96-102 http://psycnet.apa.org/journals/apl/65/1/96.pdf	Yes	40	8 -Management attitude toward safety - Work pace and safety - Effects of safe conduct on promotion - Effect of safe conduct on social status - Perceived risks -Perceived importance of safety training - Perceived status of safety officer - Perceived status of safety committee
10	UK HSE Safety Climate Tool 1997 http://www.lboro.ac.uk/departments/sbe/downloads/pmdc/safety-climate-assessment-toolkit.pdf	Yes (2012 London Olympics)	43	8 -Organizational commitment - Health and Safety oriented behavior - Health and Safety Trust - Usability of Procedures - Engagement in health and safety - Peer group attitude -Resources of health and safety -Accidents and near miss reporting

11	Gittleman et al. CPWR survey, 2010 [Case Study] City Center and Cosmopolitan Construction Projects, Las Vegas, Nevada: Lessons learned from the use of multiple sources and mixed methods in a safety needs assessment. Journal of Safety Research Volume 41, Issue 3, June 2010, Pages 263–281 http://www.sciencedirect.com/science/article/pii/S0022437510000447	Yes (Las Vegas City Center Project)	44	Not divided into factors Survey includes separate questions for general contractor and subcontractors
12	Nordic occupational safety climate questionnaire Kines, et al. http://www.arbejdsmiljoforskning.dk/en/publikationer/spoergeskemaer/nosacq-50	yes	50	7 -Management safety priority, commitment, and competence -Management safety empowerment - Management safety justice -Workers' safety commitment -Workers' safety priority and risk non-acceptance -Safety communication, learning, and trust in co-workers safety competence -Trust in the efficacy of safety systems Currently translated into 25 languages.

APPENDIX II

FACTORS THAT INFLUENCE SAFETY CLIMATE IN OMAN

SEMI STRUCTURED INTERVIEW QUESTIONS

1. In recent years the awareness of the importance for safety performance of organizational, managerial and social factors, has increased. Safety climate is a subset of organizational climate, offers a route for safety management, complementing the often predominant engineering approach. What is your opinion on the effectiveness of this new approach to enhancing safety performance in construction organizations?

2. Most organizations use records of their health and safety performance as an indication of the effectiveness of their health and safety management and systems. Do you think that an understanding of the safety climate dimensions or factors can be useful in improving the safety performance of construction organization?

3. There is a generally held view by researchers that a mature safety climate can help in building a rich safety culture and there are different dimensions or factors identified which influence safety climate. What is your view on different dimensions or factors that would need to be considered to achieve a mature safety climate and rich safety culture in construction organization in Oman?

4. Researchers and practitioners have identified safety culture and safety climate as key to reducing injuries, illnesses and fatalities on construction worksites. Many construction contractors are trying to improve these indicators as a way to move closer to a goal of achieving zero injury worksites. Do you think construction organizations in Oman need to adopt the concept of improving safety culture and safety climate to improve their safety performance?

5. Safety climate of a construction project or construction organization can be assessed by means of quantitative, psychometric questionnaire surveys, so-called 'safety climate scales', measuring the shared perceptions/opinions of a group of workers on certain safety-related dimensions or factors. The outcome of such safety climate scales are regarded as a predictor or indicator of safety performance. What is your opinion on such tool? Does your organization use such tool to assess the safety climate?

6. The leading safety climate dimensions or factors can be measured among different categories of staff working in construction organization or in a project undertaken by the construction organization on a scoring scale of 1-5 (strongly agreed – strongly disagreed). The results will reflect the safety climate of organization or safety climate of the specific project. After the assessment of safety climate leading dimensions or factors, construction organizations will be able to identify and prioritize the weak area for improvement. What could be the possible format if we want to develop a safety climate assessment tool for construction organization in Oman?

7. Do you think that the assessment of safety climate tool will help decision making unit (DMU) of construction organizations to develop different plans to achieve the required level of maturity of safety climate?

8. Different sizes of construction organization (small, medium and large) have different level of resources and competencies. In your view how different sizes of construction organization will benefit from adopting the concept improving of safety performance through safety climate?

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