



Global Scientific JOURNALS

GSJ: Volume 12, Issue 12, December 2024, Online: ISSN 2320-9186

www.globalscientificjournal.com

Challenges for Health, Safety and Environment
in Qatar's Construction industry

NIZAM MEERASAHIB

Student No. - 000904212

University of Greenwich

Department of Built Environment

MSc (Safety, Health and Environment)

Report Deadline: 02/10/2017

Word Count: 17,971

Except where stated otherwise, this dissertation is based entirely on the author's own work

Abstract

Health, Safety and Environment (HSE) has been the prime focus of policy making and the biggest challenge in almost every industry in the last couple of decades. This study aims to understand the challenges faced by HSE sector of Qatar's booming construction industry and to identify the root causes of such challenges. It has been widely accepted that the construction industry in Qatar inclines to carefully neglect the HSE regulations and standards of the rich country which are still ignorant and at times mistreated opportunely by the stakeholders. The boom has raised countrywide concerns about the general deterioration of HSE standards of Qatar.

The study has undertaken with the aid of sample surveys on some major construction contractors and subcontractors working in live construction projects between project revenue QAR 300mn and QAR 1bn (\$ 80~300 mn) having workforce approximately 1000 with a site progress of above 30%. Some of the key managerial, engineering and supervisory representatives were consulted through questionnaires and also random interviews on the foundation of hypothesis. The major data and input for the research questionnaire is compiled from recent trends in the accident / ill health data, multiple variants like Management culture, Human capital and work culture. SWOT analysis was done on the findings which pose major challenges to HSE in the construction industry and certain conclusions and recommendations were derived upon.

The main findings from this research paper illustrates that there are key challenges encountered by HSE sector which is mounting and could be controlled if properly dealt with regulators together with commitment demonstration by higher management. Throughout the research it was learnt that the key challenge to HSE improvement was factors attributing to human capital like lack of policies in recruitment, appraisals, performance measurement, training, welfare of employees, lack of quality inspections and motivational schemes added with language barriers. Contributory factors like poor enforcement, heavy work pressure to meet deadlines together with resource poverty due to high competition in the industry which eventually calls for marginal razor-edged profits gives way for compromises to HSE regulations. Since the proportion of the respondents did not include all types of construction features, extrapolating the findings into a countrywide outlook would be unrealistic.

Keywords: *regulators, management commitment, competence, skill, migrant workers, environment.*

Acknowledgements

With deep sense of gratitude, I wish to pay my profound thanks to my parents and wife who encouraged me to join University of Greenwich for this study and accomplish this research paper. This work became possible only with the valued guidance of my course supervisor, Dr. Konstantinos Evangelinos who provided valuable suggestions and crucial comments patiently throughout the work.

Next, I present my gratitude to my organization, Hyundai Engineering and Construction (HDEC) that provided me with the permission and facilities to do this research whilst being occupied on a potentially live workplace. I also remember the support of my colleagues and subordinates who timely helped me in translating, distributing and collecting questionnaires to various construction sites in the State of Qatar amidst adverse conditions.

Finally I express my sincere thanks to all the Project Managers who provided access relentlessly to their workplaces for obtaining valuable findings from their employees for this research work.



Table of Contents

List of figures	6
List of tables	7
List of abbreviations	8
Chapter1. Introduction	9
1.1 Aims	9
1.2 Objectives	9
1.3 Hypothesis	10
Chapter 2. Literature Review	10
2.1 Critical issues faced by Qatar Construction industry	10
2.2 Critical Challenges to HSE in Qatar	12
2.3 Relation between Injury Statistics and HSE Standards	13
2.4 Legal framework governing HSE in Qatar's construction industry	13
Chapter 3. Methodology	15
3.1 Introduction	15
3.2 Data Collection	16
3.3 Data Measurement	17
3.4 Questionnaire	18
3.5 Interview & Discussions	18
3.6 Audits and site surveys	20
3.7 Literature Study	20
3.8 Designing of questionnaires and interviews	21
3.9 Distribution of questionnaire	23
Chapter 4. Responses and Results	24
Chapter 5. Data Analysis from results	28
5.1 Results overview	29
5.2 Results analysis	33
5.3 Data Interpretation	42
Chapter 6. Discussion	46
6.1 Discussion on identified findings	46
6.2 SWOT Analysis	57
6.3 Summary of findings	58
Chapter 7. Conclusion and recommendations	59
7.1 Conclusions	59
7.2 Recommendations	61
7.3 Limitations of research	64
References	65

Appendices

Appendix 'A': Mail to respondents_____	74
Appendix 'B': Questionnaire_____	75
Appendix 'C': Interview Questions_____	76
Appendix 'D': Spreadsheet of responses (Company wise)_____	77
Appendix 'E': Spreadsheet of responses (Company wise) _____	78
Appendix 'F' Summary of findings_____	79

© GSJ

List of Figures

Fig: 1.0 Qualitative data analysis process for case study (Biggam 2011)	23
Fig 2.0 Line chart graph of the replies received (company wise)	27
Fig 3.0 Line chart graph of the replies received (position wise)	28
Fig 4.0 Column Chart presentation of overall results with NO answers	32
Fig 5.0 Line Chart presentation –Position (MC)	36
Fig 6.0 Line Chart presentation- Company (MC)	36
Fig 7.0 Line Chart presentation –Position (HC)	40
Fig 8.0 Line Chart presentation –Company (HC)	41
Fig 9.0 Line Chart presentation –Position (WC)	42
Fig 10.0 Line Chart presentation–Company (WC)	42
Fig 11.0 Comparative Line Chart presentation of results of company wise responses	42
Fig 12.0 Comparative Line Chart presentation of results of position wise responses	44
Fig 13.0 Comparative Line graph presentation of results of Human Capital	45
Fig 14.0 Comparative Line Chart presentation of results on responses to training	46
Fig 15.0 Comparative Line Chart presentation of results on responses to welfare issues	50
Fig 16.0 Comparative Line Chart presentation on responses to language barriers	51
Fig 17.0 Comparative Line Chart presentation on responses to audits & inspections	52
Fig 18.0 Comparative Line Chart presentation on responses to heat stress controls	56
Fig 19.0 Structure of Conclusion Chapter (Biggam 2011)	59

List of Tables

Table 1.0 List of Contractors, projects, available workforce and revenue	17
Table 2.0 Copy of Questionnaire designed for evaluation into 3 factors	22
Table 3.0 Responses by contractors	26
Table 4.0 Breakdown of responses received company wise	27
Table 5.0 Overall results from projects - % of YES and NO	30
Table 6.0 Company wise replies against each question with NO answers (MC section)	30
Table 7.0 Company wise replies against each question with NO answers (HC section)	31
Table 8.0 Company wise replies against each question with NO answers (WC section)	31
Table 9.0 Average of YES and NO replies against each question	32
Table 10.0 Position Wise Replies (MC)	36
Table 11.0 Company Wise Replies (MC)	36
Table 12.0 Position Wise Replies (HC)	40
Table 13.0 Company Wise Replies (HC)	41
Table 14.0 Position Wise Replies (WC)	42
Table 15.0 Company Wise Replies (WC)	42
Table 16.0 SWOT Analysis of contractors who participated in surveys	57
Table 17.0 Summary of research survey findings (Primary and Contributory factors)	58

List of Abbreviations

HSEMS	Health Safety and Environment Management System
H&S	Health & Safety
OSHMS	Occupational Safety and Health Management System
ILO	International Labour Organisation
MoL	Ministry of Labour
MoE	Ministry of Environment
GCC	Gulf Cooperation Council
QAR	Qatari Riyal
MEP	Mechanical, Electrical and Plumbing
MS & RA	Method Statement & Risk Assessment
QCS	Qatar Construction Specifications
KPI	Key Performance Indicators
SIS	Salini Impregilo S.p.A
UCC	Urbacon Trading and Contracting
CaQ	Carillion Qatar
HLG	Al Habtoor Leighton
HBO	HBK-Obayashi
BeMi	Besix – Midmac JV
QDVC	Qatar Dier Vinci Construction
RCA	Redco Construction Almana
HDEC	Hyundai Engineering and Construction
ABET	Al Bandary Engineering Trading & Contracting
MC, HC, WC	Management Culture, Human Capital, Work Culture

Chapter1. Introduction

HSE issues have always been a key concern in every industry around the globe and in lines with available reliable records; construction has been spotted as the most dangerous industry whereas HSE face lots of challenges. Normally construction field faces challenges in almost every country principally due to the dynamicity of the nature of work, peer pressures from management and lack of safety culture in the organizations. Construction industry is well known for its safety challenges (Tserng et al., 2014). The distinctive feature of construction activities necessitates engrossment of various stakeholders / organizations, potential specialists including a range of skillful tradesmen. All through the construction course, such multiple official bodies, experts, and workforce, quite often with multi lingual, multicultural, multiracial workforce; obviously are required to work together under vibrant changes, a transient staff and organization. The work environment features high intensity of physical work, constantly changing site conditions, and less formally defined construction processes (Reese & Edison, 2006). It is evidentially established that chief causes for construction industry accidents are due to unsafe acts, challenging working nature / conditions and weak safety management which eventually result in very unsafe work processes and systems.

1.1 Aim

The aim of this study is to analyze and evaluate the various challenges encountered by HSE in Qatar's construction industry and to highlight the identified challenges and address the concerned managements for continual improvement which could be addressed to the stakeholders for their involvement to link it with the enforcement policies.

1.2 Objectives

The key objectives are as follows:

- a) To identify the key and contributory factors which pose challenge for HSE in Qatar's construction workplaces.
- b) To conduct questionnaire sessions and interviews to itemize the findings and assess the effectiveness of health and environment standard implementations in the construction sector of Qatar.

- c) To testify the findings with associated literature in the field and substantiate the research conclusions with proper evidences.

1.3 Hypothesis

HSE encounters multiple challenges in Qatar's construction industry due to the management's objectives to incessantly place production over HSE and ineffectual enforcement by regulators.

Chapter2. Literature Review

The conflict between production and HSE is very high in construction industry and heavily weighted towards production and in Qatar, HSE has been continually encountering challenges in various dimensions and magnitudes (Neave, 2012). Several construction statistics reveal alarming number of accidents causing increasing number of fatalities (Tuma et.al., 2013), loss time incidents, uncontrolled illnesses, disabilities (Lopez et.al., 2008), unhygienic living conditions and lack of welfare facilities. It is considered that H&S issues which persist in construction industry are rarely unique to a single country and as the global community continues to shrink, it benefits to share ideas and learn lessons from past (Shibani et.al., 2013). A clear authority to OSH practitioners and adequate resources together with a high commitment from management is required to encounter challenges faced by HSE in Qatar's construction industry together with developing of proper HSE Plans and allocation of organizational roles to employees (Hafeez et al., 2016).

2.1 Critical issues faced by Qatar's Construction industry

The current construction industry is at crossroads and the companies which address the challenges face-to-face and re-imagine their business processes would be poised for substantial development and those who do not take up challenges seriously, would encounter an uphill battle for feasibility (Accenture 2016). Fundamental challenges in productivity, profitability, performance, labor and sustainability could certainly derail the industry's growth. Talent gap is a critical issue

in the industry where clients and contractors faces but unresolved for many years. In Qatar's construction industry, 10 major factors like labourers' skill material shortages, worker supervision, deficiency of skilled labour, communication gap between operatives and management, leadership crisis of construction managers', adverse climatic temperature, interruptions in addressing to "Requests for Information" (RFI), poor welfare facilities of workers and imbalanced proportion of subcontracted works are considered to be the potential challenges with construction (Abdulaziz, 2014). A report by Ventures Onsite in September 2016 found a shortage of workers especially in the mid-level skill gap (Lutz, 2013). 44% of industry managers say that they struggle to attract qualified craft labor to projects and a shortage of experienced talent augments to the challenge and such happenings occur due to legal framework which changes continually (KPMG, 2015) and 43% firms cited increased competition for projects and non-availability of visas as among their major concerns. The boom in Qatar construction industry has brought up other issues like visa shortages for certain nationalities (Qatar Construction News, 2015) coupled with lack of proper 'capability testing' which leads to delivery delays due to lack of skilled engineers. Labourers recruited with little or no training in the construction field, is yet another challenge (Doka Middle East 2016) added with continued expansion of regulatory burdens. The industry also faces serious challenges owing to conservative banking practices being followed, delayed payments, and it is construed as an aftermath of drop and fluctuation of oil prices which has no hope of influencing and more frustrating that the liquid black gold continues to descent. Qatar's construction industry might take an extra hard look at their budgets and look for additional 'fat' to cut, meaning possible project delays and cancellations and if occurs, even the best laid plans of construction firms may be thrown into disarray (Jones 2014). In addition, Qatar does not have much natural resources or major production units and hence all the materials are to be delivered by road, ship or air which increases the cost of construction. Qatar has limited resources of quality natural aggregates. The peninsula is underlain by geologically young material that is mainly weak limestone (Beaumont, 2013). Aggregate for use in concrete and asphalt is imported mainly from the United Arab Emirates, transported by ship to Qatar – a distance of ~700 km.

2.2 Critical Challenges to HSE in Qatar

Due to massive construction activities, Qatar is more vulnerable to incidents due to the scale of work and numerous ongoing building and infrastructure projects are at hectic public areas in the midst of heavy traffic and pedestrian movements with lack of commitment from management and many organizational factors. Feng et al., (2014) states that accidents happen due to deficiencies in organizational policies, weak procedural designs, negative employee attitudes, lack of management commitment and absence of safety awareness and education of staff. The State of Qatar is face lifting its infrastructure ambience by demolition of old residential and commercial structures especially in the heart of Doha and doing reconstruction with state of the art buildings. Qatar is embarking on a huge programme of new construction in preparation for hosting the World Cup in 2022 (Wells, 2014). The state of Qatar is a rapidly developing, high-income country with a population that is 75% male and is 85% expatriates (Qatar Statistics Authority, 2012). Since the commencement of face lifting was planned, multiple global companies and contractors are moving into and spreading their business roots in Qatar. As per Gardener (2013), Qatar relies almost fully on migrant professionals and workforce to make through their dream projects within short span of time. Construction sector faces challenges to Health, Safety and Environment in Qatar like any other developing nations mainly because of its nature of work, lack of mandatory safety commitment from managements, lack of education among workforce, poor communication between employees and management. The harsh work environment and the high workforce turnover negatively impact jobsite safety (Jarkas et al., 2012). Reese & Edison (2006) explains that features of construction work environment possess high magnitude of physical tasks, abrupt changes in workplaces and conditions and poor processes of safe work systems. Such distinctive features on the job necessitate a combined output of different stakeholders, entities, skilled tradesmen and workforce. Throughout the course of construction, such groups and systems have to work hand in hand amidst diversified culture, languages, races under vibrant changes, a short-lived staff as well as short-termed organization. According to Goh and Abdul (2013) the unique nature of construction activities calls for the involvement of multiple organizations, highly specialized professionals, and a variety of independent skilled trades. It is substantially established that main causes behind accidents in the construction sector are due to unsafe acts, weak safety

managements, poor processes in planning and executing the tasks and other human factors, organizational factors.

2.3. Relation between Injury Statistics and HSE Standards

Safety performance remains the major concern of almost all project managements since the key factor for timely project deliverances relies mostly on high standards of safety. Unsafe working conditions affect project quality and eventually lead to abortive reworks which incur more time and allied costs. Safety remains marginalized in the Middle East, leading to high accident rates with a number of undisclosed incidents. Sultan (2013) states that, in Qatar, the fatality rate is around 8 times as high as the UK since construction work is booming in preparation for the 2022 World Cup. ITUC (2014) mentions in an article that around 4000 occupational fatalities are expected among workers in construction till the first kick off of the FIFA World cup; if working conditions find no betterments. Al Thani et al. (2015) found that 28 foreign workers lost their lives in 2013 due to work-related accidents in Qatar. Occupational disease constitutes almost 90 % of all occupational deaths (ILO, 2008). However, there is struggle to determine if a disease is occupational or not, especially if the disability occurs years after the exposure.

2.4 Legal framework governing HSE in Qatar's construction industry

Qatar Construction Specifications (QCS) 2014 is the major regulatory document (Regulations) which delivers a comprehensive framework to promote, stimulate and embolden high standards of H&S in Qatar's construction industry. The document aims to promote H&S awareness and effective standards of H&S management by every Contractor and which requires that adequate measures are taken to protect the public where otherwise their H&S would be at risk. (QCS 2014). With regards to health and welfare standards of workers, Qatar has ratified International Labour Organisation (ILO) conventions which obligate the contractors to comply with and should any incidents / ill health occur, report to State of Qatar's Ministry of Labor (MoL).

As Qatar's construction industry is thriving, current situation calls for escalated demand from legal stakeholders and residents for healthy HSE practices countrywide which has opened new opportunities for labourers from Asian subcontinents. Ahead of the 2022 FIFA World Cup, and in line with the country's 2030 Vision, Qatar's infrastructure spend is expected to reach US\$150bn and the long lead-times experienced by the majority of the awarded projects means the impact will not be notable on construction sector growth until 2013, and will only make a considerable impact by 2016 and beyond (Kilani, 2014). Simon and Neil (2015) states that construction market for all types of workers witness a huge inflow of migrant workers mostly from the subcontinent. The recent accidents in the construction industry which occurred at Makkah and Dubai open deep thoughts into construction safety and quality. However, the western countries are targeting on the labour welfare, migrant workers on and off site facility issues and hence it has become a matter of prestige and rapport for Qatar to maintain the goodwill which is quite inevitable. Instead of being reactive, all concerned residents and regulators need to identify HSE non-conformances and violations in a proactive manner in addition to promote best safe practices in the construction industry with the aid of all relevant supply chains (Fass et al., 2016). The potential challenges to the sector are exacerbated with existing inconsistencies in regulations, conflicting mandates, weak enforceability, lack of resources and political conflicts. A review of the existing HSE legal and regulatory framework was undertaken which highlighted the importance of a very clear distinction between the authority that issues the operating licenses and the authorities that regulate safety and environment in order to prevent conflict of interest and install a natural checks-and-balance system.

To improve the management of construction waste, draft codes of practice have been developed for construction and demolition waste. These will require pre-demolition audits, waste management plans, removal of all furnishings and fittings before demolition and segregation of waste on site into a minimum of hazardous, non-inert and inert materials. The codes of practice have been put together on a collaborative basis by the Ministry of Development Planning and Statistics and Qatar Standards, using international best practice to produce an appropriate system for conditions in Qatar. The fifth edition of the QCS, (2014), permits the use of recycled aggregates in a wide range of applications that were not permitted by the fourth edition, including use as a partial replacement for imported gabbro in concrete.

Chapter 3. Methodology

3.1 Introduction

To identify the challenges for Health, Safety and Environment faced by Qatar's Construction Industry, a research study was conducted on five large sized construction Main contractors and five medium sized subcontractors. The criteria for selection of the contractors were the project revenue, scope of their works, volume of workforce and involvement in Qatar's construction industry. The selected Main contractors were occupied in Qatar's mega projects with a workforce ranging from 2000 to 5000 whereas subcontractors who were specialized in MEP, Civil and landscapes had workers between 200 and 1500 in construction sites and working under the HSEMS of Main contractors. Kilani (2014) states that deployment of an average of 100 working manpower in almost all mega projects and it is crucial as far as Qatar National Vision (QNV) 2030 is concerned.

The research was based on the guidance of research and scholarly articles together with academic literature available on challenges faced by construction industry in GCC countries in general. The methods used for study was basically questionnaire surveys, interviews and discussions and site inspections with the active involvement of site management and safety practitioners. In terms of advantage, direct interviews / discussions supersede questionnaire since the information and research scope be straightforwardly explained and questions answered in the latter, despite the fact that the anonymity element is not achieved (Schein, 1992). It was realized during the review of literature that challenges are immeasurable in figures in a dynamic industry like construction due to the factors like organisation influences, attitude, perceptions and culture. A quantitative analysis of most of the tasks in a construction industry is difficult for contracting companies which are dynamic in nature and are frequently mobile among sites, hence with limited contacts and communication with their management and core organisation (Swuste *et al*, 2012). Since the challenges are multiple in nature, it's difficult to evaluate since it relates to beliefs and attitudes about occupational safety and health (O'Connor *et al*, 2011). However interviews were conducted with senior managerial staff to identify the challenges in addition to questionnaire surveys. Questionnaire surveys and interviews facilitate the

assessment of attitudes and perceptions of individuals in terms of H&S (Naylor & Roberts, 2014). Research studies are limited on workers influences, which revealed gaps in conduct of academic research on current safety challenges in the building sector of the construction industry. It is also difficult to meet objectives through assessment of current empirical studies, hence this research identifies that execution of preliminary research and collection of data would be the apt method to obtain the objectives of research. Current hypothetical papers are analysed which focuses on challenges to HSE in construction industry and previous papers on such challenges in other Gulf countries were taken for guidance which necessitated and enabled the generation of a suitable questionnaire survey format.

3.2 Data Collection

Questionnaires was finally adopted as one of the key tool to conduct the research since it was found to be more suitable, feasible and easy to reach the concerned input holders. Additionally interviews were also conducted among some key personnel of the contractors for collection of detailed information and processes. More than one method shall be utilized to collect research data since it facilitates one to triangulate the results, Bell (2010). Questionnaires are developed from existing literature review and generated with a mix of qualitative and quantitative studies. In a more current study of management journals, it was specifically investigated how management researchers constructed research questions from existing literature (Sandberg & Alvesson, 2011). Sandberg (2011) adds that constructing gaps or 'gap spotting' is the most dominant way of generating research questions from existing literature in management.

In order to meet the objective of project work, a set of questionnaire was prepared and mailed to selected Contractors and subcontractors Management staff. Further interview was conducted with available company directors and certain senior managers.

The following Contractors were surveyed through questionnaire for this study and their current construction projects, workforce and project revenue are as follows:

S.No	Project Owners	Contractor / Subcontractor	Labour force	Value Millions(US\$)
1	Al Khor WC Stadium	Salini Impregilo S.p.A (SIS)	2300	2 bn
2	Mall of Qatar	Urbacn Trading & Contg (UCC)	1800	1.2 bn
3	Mshreib Down town Doha	Carillion Qatar (CaQ)	2570	1.6 bn
4	Qatar Economic Zone	Al Habtoor Leighton (HLG)	675	600 mn
5	Msherib Phase 3	HBK-Obayashi (HBO)	2000	1.2 bn
6	Khalifa WC Stadium	Besix – Midmac JV (BeMi)	1600	900 mn
7	Qatar Rail	Qatar Dier Vinci Const (QDVC)	900	12 bn
8	TB Hospital	Redco Construction Almana	1400	650 mn
9	National Museum of Qatar	Hyundai Engg & Construction	3400	1.6 bn
10	Amwaj Tower	Al Bandary Engg Trading	1200	800 mn

Table 1.0 List of selected Contractors, projects, available workforce and revenue

The above 10 ongoing construction projects in Qatar were undertaken for the study since their workforce and work scopes matched the research process and the HSE challenges could be determined through effective ways of communicating with the management.

3.3 Data Measurement

For identifying the challenges faced by Qatar's Construction Industry, methods like questionnaires, interviews, consultation with workforce and document checks were conducted since it was pertinent to come up with a result which clearly highlights the challenges and meet the research objectives. On careful review of the literature it was learnt that for evaluation of identification of challenges to HSE, three methods could be adopted namely interviews / questionnaires, workplace inspections and HSE document study.

3.4 Questionnaire

Questionnaire is one of the preferred methods for the survey due to its many advantages of data collection and ease of conduct with reduced efforts. Biggam, (2011) explains that questionnaires are recognized as one of the credible methods since it is a research strategy which is already tried and tested to use; they are advantageous in quick completion, distribution and enable collection of large volume data with minimal effort (O'Connor et al., 2011). Questionnaires are mostly anonymous in nature and hence there is high likelihood of receiving frank and honest replies, which has also an ease of reach to remote members. Whereas some researchers say that this method has disadvantages over others due to its reliability and selection of participants which do not give a clear qualitative and quantitative approach on the research. Questionnaires rely on databases and neither observations nor field status (Fang and Wu , 2013) and are initially a quantitative method of research strategy which concerns just quantities and measurements which determine the “how” questions.

Further, the questionnaire survey was mailed to various managerial and supervisory staff within the selected construction Contractors where good responses were received in terms of quantity and quality. The survey results intends to bring out the existing perceptions, beliefs, attitudes and approach to HSE and to analyse trends through the scrutiny of results, which would further test the hypothesis. Methodology of accomplishing objectives is by way of doing a review of literature to critically examine the present state of OSH in and analyse the concept of safety climate in the construction industry. Current academic papers on such factors which contribute to safety environment for construction workers would also be evaluated critically which should be able to generate an appropriate questionnaire.

3.5 Interview, Discussions

Interview (Glendon and Stanton 2000) is a commonly used method which possesses an extra advantage of obtaining the accurate results in terms of attitudes and perceptions when compared to other methods. Instant information and transparency is yet another advantage and the importance of research could be well delivered and

objective answers could be achieved but with the disadvantage that they do lose the element of anonymity (Hinze et.al., 2013). Through conduct of interviews, both qualitative and quantitative approach could be utilized with the 'why' and 'how' questions can be advocated for H&S in construction studies (Biggs *et al* 2013). Choudhry (2008) identified that interviews can gain an insight in establishing the attitudes towards safety and can easily seek into the causation of accidents. Interviews have more advantages over questionnaires since the former provides opportunities for the interviewer to probe responses, investigate feelings and motives in addition to follow up ideas which the latter one cannot deliver (Bell 2010). Still there are disadvantages for interviews chiefly because it is time consuming for meeting the right person and seeking appointment, time restrictions, interferences during interviews and hence a true sample cannot be collected (Biggam 2011). Restrictions like ethical, moral and social are barriers to interviews and tend not to be honest or could refuse to participate. Had there been no time limitations, interviews could prove as a great tool for the conduct of research in order to achieve in-depth understanding of the responses. Another advantage of interview is the synchronous communication where the answer of the interviewee is more spontaneous, without an extended reflection. However, due to this reason, the interviewer need to focus more both on the questions to be asked and the answers presented (Raymond 2006); especially when an unstructured or semi structured interview list is used, and the interviewer has to formulate questions as a result of the interactive nature of communication. (Wengraf 2001) even speaks of "double attention", which means "that one must be both listening to the informant's responses to understand what he or she is trying to get at; simultaneously, ensuring that all questions are liable to get answered within the fixed time at the level of depth and detail that you need" (Raymond 2006). A disadvantage is that the interviewer has no view on the situation in which the interviewee is situated and hence the interviewer has lesser possibilities to create a good interview ambience (Markham 2004).

While selecting the questions for interview, considered was made to make the inputs in lines with the literature review and hypothesis. Examining existing literature helps researchers identify viable and important research questions or hypothesis (Hancock 2015). Since interview is one of the potential tool of this research, selection of interviewees was important and hence some of the senior Construction and Project management staff of the Contractors was interviewed with a short questionnaire

mainly focusing on the most critical activities occurring at their sites in addition to the risk factors which they considered for the project delivery. Selection of interviewees directly influences the quality of the information attained and the most important consideration is to identify those persons in the research setting who may have the best information with which to address the study's research questions (Hancock and Algossine 2015). Some questions included the importance of HSE policy, need of a positive safety culture and the legal obligation of Management towards HSE matters. Reporting requirements and procedures, health and environment statistics, accident investigation, HSE incentive scheme, checking of pre-qualification documents of subcontractors in the HSE perspective, participation in H&S meetings and committees, QCS OHS standards were some of the other questions asked in the interviews. The interviews were recorded in the audio recorded to give more focus to the core questions and gain accurate record. The interviews are recorded, where possible, for two reasons: to ensure that the data analysis is based upon an accurate record (eg. transcript) and to allow the interviewer to concentrate on the interview (Biggam 2011).

3.6 Audits and site surveys

Audit is a systematic and critical examination of the organization's HSEMS and allows the researcher to find out the safety behavior and commitment on site (Fang and Wu, 2013). However Bell (2010) identified that it has disadvantages for finding out observations through audits since the workers would be aware of the event and are likely to alter their routine behavior as they feel that they are watched. The researcher further could misinterpret and the results would ultimately be influenced on perceptions and not realistic happenings. Such disadvantages pose serious diversions from the true research and hence this method would not be suitable to achieve the objectives of this study.

3.7 Literature study

Literature study facilitates to critically summarize the current knowledge in the area of research, identify any strengths and weaknesses in previous work. This would, so helping you to identify them in your own research and thus eliminate the potential weaknesses, whilst bringing to the fore the potential strengths. In addition, a good

and full literature search will provide the context within which to place your study. The literature review helps the researcher to refine the research questions and embed them in guiding hypotheses that provide possible directions the researcher may follow (Gay et.al., 2006). Literature study and review has been used to develop the questionnaire in lines with the hypothesis established in the research for identifying the challenges of HSE in Qatar's construction industry (Melia et.al, 2008).

3.8 Designing of questionnaire and interviews

Carrying out the research is invariably a relatively straightforward matter once the question is clearly defined and it is axiomatic that 'an answer is only as good as the question' and a poorly constructed or vague question can only result in a poor or useless answer (Allison et al., 2016). A good time has been spent on designing the questionnaire in order to achieve a good rate of response; the questionnaire format was generated to look less exhaustive. Cooper (2000) mentions that a survey shall get highlighted or focused to all levels of people as far as possible and applicable to multiple nationalities and languages. Hence respondents were provided with questionnaire based on dichotomous styled was used in a YES, NO and Don't Know format. Very less effort was expected for the individual in responding effectively or otherwise management staffs in construction tend not to answer with many excuses of time and hectic responsibilities. Alison et al., (2016) adds that feasibility and practicability need to be taken into account when formulating research questionnaire. The types of questions were formatted in such a way that the respondent require to mark his opinion and at places to fill in certain words or phrases which necessitates minimal effort and time. Bell (2010) styled customary methods in questionnaires; be ot of any types of format; the respondents need to just tick as responses, or maximum a figure or respond in a single word. In this work, respondents were required to put tick against statements under the grid table category of Yes, No or Not aware which is almost a cross sectional nature. Where the reliability of each response option cannot be established due to a cross-sectional nature, analysis of relative reliability of the three response options can be computed in a Spearman rank order correlation coefficients between the various response options (Laerhoven 2004). The assumption was that at least one of the response options would best represent the "true" answer and hence a high correlation coefficient would represent

high reliability of all three response options; likewise a low correlation coefficient would indicate that one (or two) response options were less reliable (Derkx 2004). Consequently, a questionnaire survey was designed to capture key aspects like knowledge and awareness of HSE system, view towards HSE and the existing barriers to HSE in construction sector in Qatar.

The completed questionnaire format was circulated to Managers, Engineers, Supervisors and HSE personnel among the selected projects by mail (*Appendix 'A'*) where it was briefed on the guidelines to fill out. Respondents were given 2 weeks' time for completion and return. Emails were sent to respondents and some questionnaires were carried in person to the staff whose email ID's were not available and which was rebounded and interviews conducted in person and over phone to some key personnel of the selected contractors.

A dichotomous styled question set was generated based on the recent communiqués, trend analysis and from my experience derived from the literature review and hypothesis to ensure more relevance and with the objective to gain realistic facts. 20 questions were finalized for the survey based on the crisis resolution and management commitment towards HSE focusing on the Management culture, Human Capital and Work Culture.

#		DESCRIPTION	YES	NO	NA
1	MANAGEMENT CULTURE	Is your company MANAGEMENT COMMITTED to Health & Safety (H&S) of all employees and do they have DUTY OF CARE?			
2		Does your company have H&S POLICIES AND PROCUDURES and is it renewed periodically?			
3		For hiring subcontractors/suppliers, is their HSE PERFORMANCE/PROFILE considered to QUALIFY approval?			
4		Is RISK ASSESSMENT and WORK METHOD STATEMENTS prepared for critical and other activities prior to work?			
5		If there is PRESSURE to MEET DEADLINES , is H&S prioritized than production by RISK MANAGEMENT?			
6		Are accidents and incidents INVESTIGATED in your workplace properly and REPORTED?			
7		Does your management discuss H&S issues in CONSTRUCTION MEETINGS and conduct SAFETY TOURS?			
8		Are adequate RESOURCES allocated for HSE in your company?			

1	HUMAN CAPITAL	Does your company consider H&S KNOWLEDGE / SKILLS at the time of RECRUITMENT of construction employees?			
2		Do you think construction SUPERVISORS should be COMPETENT enough to perform tasks safely?			
3		Do Managers require to attend HSE TRAININGS and need they be aware of H&S at workplace?			
4		For employees' APPRAISAL & PROMOTIONS, is HSE PERFORMANCE VALUED by the management?			
5		Do you consider WORKERS WELFARE STANDARDS with importance and inspect their living conditions?			
6		Are HSE AUDITS and INSPECTIONS conducted regularly at workplace by competent staff and the observations rectified ?			
7		Does your company take adequate measures at work places and off site for prevention of HEAT STRESS in SUMMER?			
8		Do you consider LANGUAGE FACTORS for communication between workers & supervisors for understanding of HSE aspects?			
9		Do your company conduct SAFETY MOTIVATIONAL CAMPAIGNS AND INCENTIVE SCHEMES for employees?			
1	WORK CULTURE	Does the company comply with the LEGAL HSE REGULATIONS, safety polices and procedures properly?			
2		Does your workplace consider ENVIRONMENTAL LAWS, WASTE MANAGEMENT AND HEALTH policies?			
3		Do the SAFETY VIOLATIONS in the work place treated with PROPER DISCIPLINARY ACTIONS & retrained in H&S?			
Y- YES, N- NO, N/A - NOT AWARE					

Table 2.0 – Copy of Questionnaire designed for evaluation into 3 factors

It was learnt from the literature review that such style is for easy understanding to the respondents and much convenient and effective to evaluate the measurable values and comparable between different criteria and groups. Positive / Negative styled questions are most suitable where ambiguity and misinterpretation is the enemy (Chaudhary, 2007) and respondent could take advantage of close-ended questions and conclude quickly and with efficacy (Andaleeb and Hassan, 2016) and usage of close ended questions also helps to attract more respondents (Ghazi et.al., 2017)

3.9 Distribution of questionnaire

Questionnaires were sent by e-mail to randomly selected major construction contractors and subcontractors working in live projects with an average project sum \$ 80~300 mn and approximate workforce around 1500 and site progress above 30%. The respondents included Directors, Managers, Engineers, HSE Staff, Senior Work Supervisors, Administration and Finance Heads. It was requested to answer all the

questions without which a clear analysis would not have been possible. Respondents were selected based upon their profile in the company, decision making authority and their interface with HSE issues in general.

Chapter 4. Responses and Results

To enable a proper and realistic data analysis, the process defined by Biggam (2011) was implemented for this work as an apt framework of analysis and as illustrated in Fig 1.0.

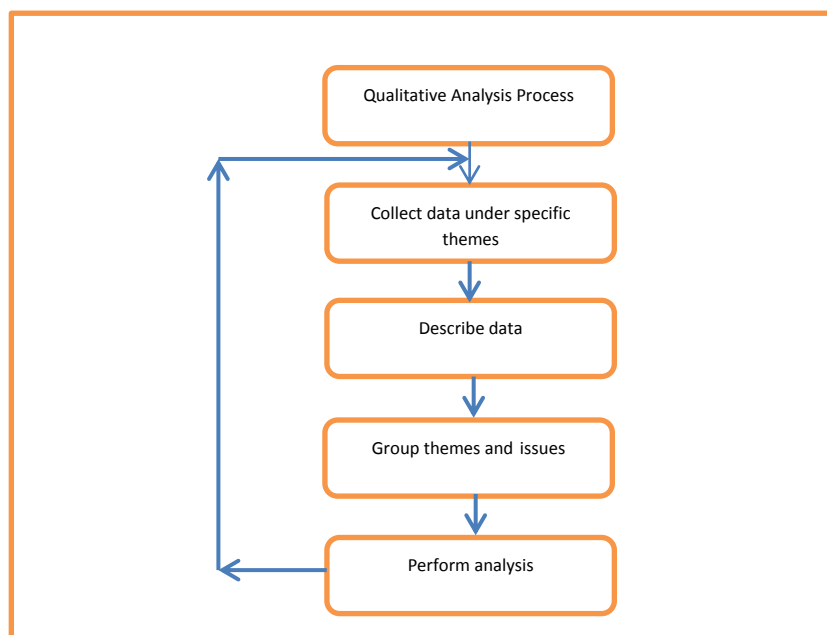


Fig: 1.0 Qualitative data analysis process for case study (Biggam 2011)

The values derived from the dichotomous pattern against each statement were segregated under the number of 'Yes', 'No' and 'Not Aware'. To arrive at a conclusion of survey on the actual challenges identified in the research, questionnaire was divided into 3 segments namely Management Culture, Human Capital and Work Culture. Under the Management culture, questions pertaining to the commitment of management, safety culture, risk assessment, investigations were considered. In the second category, questions regarding human factors and capital were included namely training systems, inspection systems, supervisor's competency, accident investigations, third party involvements, linguistic barriers, workers welfare and motivational programmes were included. In the final segment, questions involving climatic controls at work places, management of wastes and

inspections by local authorities were included. the total number of Y,N and NA is summed up under the three categories. Similarly, all dimensions can be evaluated in the dichotomous style to interpret the major challenges for a concluding the research. Grouping related questions together under an appropriate heading, as above, will make life easier for you when you eventually get around to undertaking your data analysis (Biggam 2011).

All the 10 companies' questionnaires were segregated and each company data was summarized separately. Against each questions total count of Y,N and NA was written and percentage of each Y,N and NA was calculated by dividing the number of Yes by total replies received from the individual company multiplied by 100 to obtain the percentage. The entire 20 questions were categorized into three sections namely Management culture, Human Capital and Work Culture and distribution of questions were 8, 9 and 3 respectively. To strengthen and cross examine the data analysis findings, position wise calculation was also carried out where in both analysis, same findings were concluded. A further breakdown and data comparison data simplifies the task for determination of score levels against each questions and sections in order to conclude the strong elements (Guldenmund, 2010). A trend analysis would be generated centered on the results, for both organizational and behavioral factors. Similarly the number of NO's was added to analyze the negative elements which are the actual challenges in the research subject. Further comparison graphs were prepared which clearly identifies the trends achieved against each questions independently. In this manner, the individual scores could be compared position wise and company wise to cross examine the findings. Such obtained results were then compared which would support the hypothesis challenges exist in the construction industry and identification of those through the research.

Responses to each question were tabled and analyzed in general categorically; by which a complete view of the challenges to HSE in the construction industry in specific in the State of Qatar is presented. An, in-depth analysis of the results obtained is conducted to identify the depth and volume of such problems under each category. In this research consideration has been given to fill the gap in literature review and multiple positions of all level employees were considered to make a proper understanding of the challenges. Gaps in the literature need to be filled, as qualitative research is required for process understanding (Levine et al., 2012) and safety inspections are not commensurate to perspective of system thinking where

such inspections remain under explored in researches pertaining to safety management (Woodcock,2014).

The questionnaires send to respondents numbered 257 out of which 209 were received (79%) with acknowledgement and responded back within a span of 14 days. Some replies were received after my repeated mail and telephonic reminders. It is unusual for researchers, at any level, not to recognize limitations in their own work and it is important to recognize potential problems and to show how you have addressed them (Biggam 2011). A sample mail of the questionnaire sent to a respondent is attached as Appendix 'B' and one of the sample sheet of question for interview is attached as Appendix 'C'. The received ones were thoroughly counterchecked to ensure that it is filled suitably. 16 were found to be filled with multiple responses or missing responses; which were still accepted for analysis since they were found of importance to the course of study.

A re-analysis was conducted for each variable in order to support the data evaluation and to gather firm responses by removal of neutral and irrelevant ones. In a survey data, for simplifying purposes, neutral responses can be removed and combine categories which are almost similar; this can enable every response to be included to obtain the entire percentage of the sample population who either agrees or negates (Statistics Café 2014).

The questionnaire received the responses as follows:

No.	Name of Contractors	SENT	RECEIVED	Response %
1	Salini Impregilo S.p.A (SIS)	32	27	84%
2	Urbacn Trading and Contracting (UCC)	24	21	87%
3	Carillion Qatar (CaQ)	31	22	71%
4	Al Habtoor Leighton (HLG)	12	9	75%
5	HBK-Obayashi (HBO)	28	22	78%
6	Besix – Midmac JV (BeMi)	21	17	81%
7	Qatar Dier Vinci Construction (QDVC)	16	12	75%
8	Redco Construction Almana (RCA)	23	20	86%
9	Hyundai Engineering and Construction (HDEC)	52	47	90%
10	Al Bandary Engineering Trading (ABET)	18	12	66%
Total		257	209	79%

Table 3.0 Responses by contractors

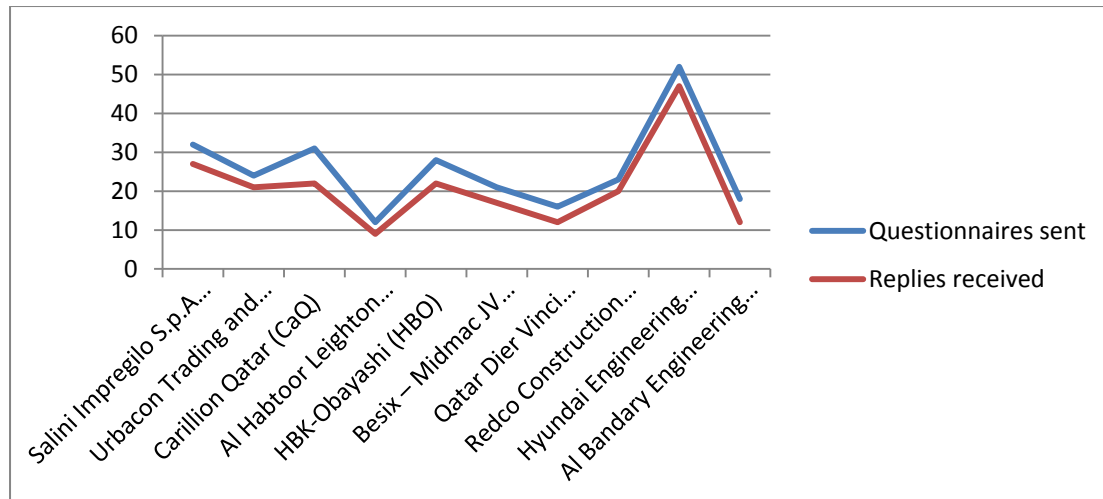


Fig 2.0 Line chart graph of the replies received company wise

Out of the responses received from the Contractors, Hyundai Engineering and Construction topped with 90% whereas one of the local Contractor M.s Al Bandy Trading and Contracting responded comparatively lowest with just 66%. However, profession wise the managers did responded more.

No.	Firms	Response	Director	Manager	Engineer	HSE Staff	Supervisors	Admin Heads	Finance Heads	TOTAL
1	SIS	27	1	3	7	6	8	1	1	27
2	UCC	21	1	2	4	3	10	0	1	21
3	CaQ	22	1	3	3	4	9	1	1	22
4	HLG	9	0	1	2	2	3	1	0	9
5	HBO	22	1	4	5	4	6	1	1	22
6	BeMi	17	2	1	3	5	4	1	1	17
7	QDVC	12	1	1	0	3	5	1	1	12
8	RCA	20	0	2	4	3	10	0	1	20
9	HDEC	47	1	6	12	5	21	1	1	47
10	ABET	12	0	1	3	4	3	1	0	12
TOTAL		209	8	24	43	39	79	8	8	209

Table 4.0 Breakdown of responses received company wise

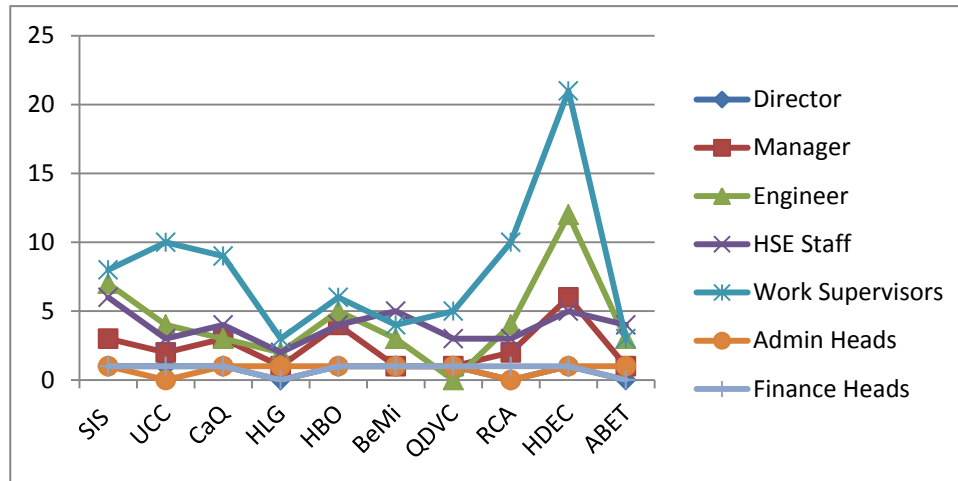


Fig 3.0 Line chart graph of the replies received position wise

Most of the managers and engineers responded well and to the survey whereas the senior most staff like directors and finance heads did not have much idea on the survey and could not suitably respond. However some of their relevant parts have been considered to include in the survey. It was realized that the key reason for failing to complete the questionnaire was associated with time constraints, whilst it was apparent that few of the senior management personnel considered the questionnaire have a bearing on the management function.

Chapter 5. Data Analysis from results

In Management Culture section, the key management points were included like commitment to HSE, Existence of HSE Policies and procedures, selection of HSE criteria for subcontractors, availability of Method Statements / Risk Assessments prior to commencement of work, prioritization of HSE against production, procedures for accident investigation, conduct of meetings and tours by Project Management and allocation of resources for HSE aspects.

In the Human Capital section questions included, the role of HSE in recruitments, appraisals, necessity of competency for supervisors and other employees, HSE trainings for Management and all employees, consideration of welfare standards of workforce, conduct of routine HSE audits and inspections, prevention of heat stress, consideration of linguistic barriers and communication between operatives and motivational programmes for promotion of HSE at workplace.

In Work Culture several factors were included like compliance and enforcement of HSE policies and procedures at workplaces, fulfillment of statutory requirements in

HSE aspects, consideration of Environment and Health standards during construction work and implementation of HSE Management systems like work permits and identification of safety violators and subsequent disciplinary actions in the organization.

5.1 Results overview

In lines with the received responses from the companies, certain findings were evident from the percentage of responses. In order to strengthen the analysis and to further justify the obtained findings, a scrutiny of the responses in terms of positions of respondents was made for each answered questions.

Out of the three, Human capital section showed a clear negative trend with 50.7% of responses demonstrated whereas 41.73% responses were positive and 7.6% were not aware of the Human capital factor. In this particular section, many human factors like linguistic factors (54.1%), Heat stress prevention measures (52.6%), safety motivational aspects (52.2), trainings (53.1%), performance measurement criteria for appraisals (49.8%) were considered most in negative selections. This implies that they fall as challenges to the construction industry in general.

With respect to the H&S policy in Qatar, contractors display a serious lack of understanding of policies and procedures pertaining to H&S. It is clearly evident that most of the subcontractors don't have commitment or even awareness of a HSE policy. The case is not much different even among some Principal Contractors on the awareness and need for policy on Health, Safety and Environment. The responses prove that 55.98% of Contractors possess a policy whereas, on review its obvious from replies and explanation that almost 50% of the staff are even aware of such policies and what it contains. However HSE staff and some senior management personnel did understand the contents and need for HSE policy which means that there is lack of communication of the policies down line to all levels of employees. In order to alleviate this issue, a comprehensive H&S training needs to be organized at the primary stages of entering into the industry.

Contractors	Scores (%)					
	MANAGEMENT CULTURE		HUMAN CAPITAL		WORK CULTURE	
	YES	NO	YES	NO	YES	NO
SIS	59.76	40.24	31.17	68.83	66.42	33.58
UCC	58.0	41.99	36.64	63.36	58.60	41.40
CaQ	61.67	38.33	37.96	62.04	62.94	37.06
HLG	63.02	36.98	37.50	62.50	66.67	33.33
HBO	64.46	35.54	28.57	71.43	66.67	33.33
BeMi	75.00	25.00	25.40	74.60	75.00	25.00
QDVC	72.7	27.27	35.17	64.83	72.73	27.27
RCA	73.3	26.70	31.96	68.04	75.00	25.00
HDEC	74.6	25.37	40.10	59.90	77.64	22.36
ABET	55.0	44.98	44.74	55.26	58.89	41.11

Table 5.0 Overall results from projects - % of YES and NO

Que 1~8 (MANAGEMENT CULTURE) – REPLIES with NO answers

S. No	DIMENSIONS	SIS	UCC	CaQ	HLG	HBO	BeMi	QDVC	RCA	HDEC	ABET
1	MANAGEMENT COMMITMENT & DUTY OF CARE?	40.0	42.11	38.1	37.5	33.33	25.0	27.27	26.32	23.91	23.91
2	H&S POLICIES AND PROCUDURES - REVIEW	40.00	42.11	38.1	37.5	33.33	25.00	27.27	26.32	24.44	24.44
3	SUBCONTRACTORS, HSE PERFORMANCE	38.46	42.11	38.1	37.5	33.33	25.00	27.27	26.32	23.91	23.91
4	RISK ASSESSMENT /METHOD STATEMENTS	40.00	42.11	38.1	33.3	33.33	25.00	27.27	26.32	25.00	25.00
5	PRESSURE to MEET DEADLINES , RISK MANAGEMENT?	40.00	41.18	38.1	37.5	33.33	25.00	27.27	29.41	31.58	31.58
6	ACCIDENTS AND INCIDENTS INVESTIGATED, REPORTED?	40.00	42.11	40.0	37.5	33.33	25.00	27.27	26.32	23.40	23.40
7	MANAGEMENT MEETINGS/ SAFETY TOURS?	43.48	42.11	38.1	37.5	45.45	25.00	27.27	26.32	26.83	26.83
8	HSE RESOURCES	40.00	42.11	38.1	37.5	38.89	25.00	27.27	26.32	23.91	23.91

Table 6.0 Company wise replies against each question with NO answers (MC section)

Que 9~ 17 (HUMAN CAPITAL) – REPLIES with NO answers

S. No	DIMENSIONS	SIS	UCC	CaQ	HLG	HBO	BeMi	QDVC	RCA	HDEC	ABET
1	H&S KNOWLEDGE / SKILLS – RECRUITMENT POLICY	69.23	42.11	38.1	37.5	33.33	25.00	27.27	26.32	23.91	45.45
2	COMPETENT SUPERVISION	69.23	42.11	38.1	37.5	33.33	25.00	27.27	26.32	24.44	45.45
3	HSE TRAININGS FOR MANAGERS & EMPLOYEES	69.23	42.11	38.1	33.3	33.33	25.00	27.27	26.32	23.91	41.67
4	ANNUAL APPRAISAL AND HSE PERFORMANCE	66.67	42.11	38.1	37.5	33.33	25.00	27.27	26.32	25.00	45.45
5	WORKERS WELFARE STANDARDS	69.23	41.18	40.0	37.5	33.33	25.00	27.27	29.41	31.58	45.45
6	HSE AUDITS and INSPECTIONS	68.18	42.11	38.1	37.5	45.45	25.00	27.27	26.32	23.40	45.45
7	HEAT STRESS PREVENTION IN SUMMER?	69.23	42.11	38.1	37.5	38.89	25.00	27.27	26.32	26.83	45.45
8	LANGUAGE & COMMUNICATION FACTORS	69.23	42.11	38.1	37.5	33.33	25.00	27.27	26.32	23.91	45.45
9	SAFETY MOTIVATIONAL SCHEMES	69.23	42.11	38.1	37.5	33.33	25.00	27.27	26.32	23.91	45.45

Table 7.0 Company wise replies against each question with NO answers (HC section)

Que 18~20 (WORK CULTURE) – REPLIES with NO answers

S. No	DIMENSIONS	SIS	UCC	CaQ	HLG	HBO	BeMi	QDVC	RCA	HDEC	ABET
1	LEGAL HSE REGULATIONS, IMPLEMENTATION	38.46	42.11	38.1	37.5	33.33	25.00	27.27	26.32	23.91	45.45
2	ENVIRONMENTAL PROTECTION & WASTE	38.46	42.11	38.1	37.5	33.33	25.00	27.27	26.32	24.44	45.45
3	SAFETY VIOLATIONS & DISCIPLINARY ACTIONS	23.81	40.00	38.1	33.3	33.33	25.00	27.27	26.32	23.91	41.67

Table 8.0 Company wise replies against each question with NO answers (WC section)

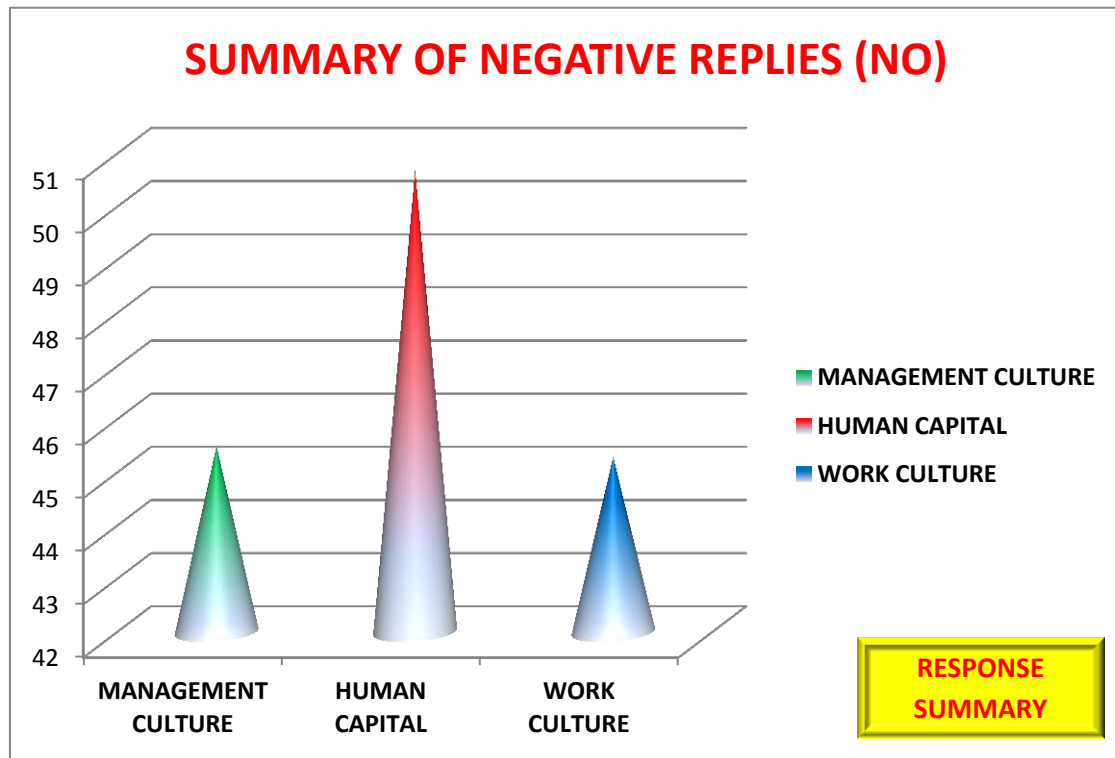


Fig 4.0 Column Chart presentation of overall results with NO answers

SECTIONS	QUESTIONS	AVERAGE	
		YES	NO
MANAGEMENT CULTURE	MANAGEMENT COMMITMENT / DUTY OF CARE	66.1	33.9
	HSE POLICIES / PROCEDURES	66.05	33.95
	SUBCON HSE STANDARDS	67.05	32.95
	METHOD STATEMENT & RISK ASSESMENT	65.99	34.01
	RISK MANAGEMENT & PRIORITISATION	64.93	35.07
	ACCIDENT INVESTIGATION	64.94	35.06
	MANAGEMENT HSE MEETINGS AND TOURS	64.91	35.09
	ALLOCATION OF RESOURCES FOR HSE	66.10	33.90
HUMAN CAPITAL	HSE KNOWLEDGE / SKILLS - RECRUITMENT	34.93	65.07
	COMPETENT WORK SUPERVISION	34.86	65.14
	HSE TRAINING FOR MANAGEMENT	35.29	64.71
	HSE PERFORMANCE AND APPRAISAL	34.77	65.23
	WORKERS WELFARE STANDARDS	34.80	65.20
	AUDITS AND INSPECTIONS	34.65	65.35
	HEAT STRESS PREVENTION	34.58	65.42
	LANGUAGE BARRIERS & COMMUNICATION	35.18	64.82
	MOTIVATION FOR SAFETY	35.23	64.77
WORK CULTURE	COMPLIANCE TO SAFETY POLICIES	67.18	32.82
	ENVIRONMENTAL AND SUSTAINABILTY	67.92	32.08
	DISCIPLINARY ACTIONS FOR VIOLATIONS	69.06	30.94

Table 9.0 Average of YES and NO replies against each question

5.2 Results Analysis

5.2.1 Management Culture (Questions 1~8)

Out of the replies received from the companies it was learnt that in the questions pertaining to Management Culture, the positive responses trend that there is a good culture in the management with 66.1% of the respondents agreed the existence and awareness and need for Management Commitment and Policies. It is also understood that companies do have H&S policies and procedures in place but more than 33 % of employees respond and feel or unaware on this element which clarifies the point that that some managements failed to cascade its prominence to employees which is again a nonconformance to the management commitment. Such gap could escalate HSE violations at workplaces and we take into account of the whole industry, it is a factor which pave for challenges in the construction arena. Besides the managers' commitment did not display a positive approach for sharing of information regarding safety and apparently there was no proactive contribution in encouraging or motivating their employees. The management support to the workers is very important in providing the best solution for the safety related problems (Charehzehi and Ahankoob, 2012).

66.05% respondents answered that subcontractors prequalification and safety standards need to be fulfilled prior to start of works. This means that most of the specialized works are executed by subcontractors who lack good HSE standards and hence the need to select qualified subcontractors in improves the overall HSE quality of the workplace. It can also be seen that if all Principal Contractors hire subcontractors which realistically fulfill the HSE requisites, the substandard contractors will lose business and enhance their standards of H&S in general thereby the nation's HSE standards will reduce the challenges faced. It was further learnt from survey and site visits that subcontractors do not have clear cut HSE policies and they have multiple sub-sub contractors and suppliers down the line which are seconded to the Principal Contractors as and when required. Such situations could totally decelerate the HSE standards of the workplace. A pure effect from issues arises while seconding the task to subcontractors was identified, though it is possible since the specific effects are hard to corroborate. Within the construction industry, there are many negative implications for safety that arise from sub-contracting arrangements (Gyi et al., 1999) Haslam et.al, (2005) mentions that

this give way to problems with gaps in communication and unclear responsibilities between multiple contractors occupied in one location. Furthermore, it is also interpreted that there is a large amount of job rotations in the workplaces where due to certain HSE violations when actions are initiated by Site Management, they are abundantly replaced with others who also don't possess any pre requisite HSE standards. It is common that multiple sub contractors are occupied in every construction projects, with varying standards and working conditions where there is no integration and unified policies between them which tend to work under different motives and objectives. Even there are no contractual obligations for HSE which makes the situations more complicated and diverse.

The questions for need for documentation works like Method Statement and Risk assessment for critical works was also responded with a positive trend (60%) which depicts that there is a need to develop and generate such documentations. This is also a compliance with the 18001:2007 requirements and there is a clear necessity of generating a clear methodology of the proposed works and seeks approval from the consultants. If all the contractors adhere to this method, there could be a proper procedure to execute works thereby reducing the possibilities of incidents, ill health, reworks and endangering the operatives from hazards and risks. The Risk Assessment could identify the possible risks and their levels of severity and likelihood with the Contractors mitigation measures to prevent accidents and reduce the consequences and probabilities of possible harm and injury which could occur at workplace. Because most occupational accidents in the construction industry occur during the performance of a task, the idea of relating the tasks to hazards and relating the hazards to events has been evaluated as a good methodology for risk assessment at a site (Bas,2014). However on an average, 34.01 % replies were negative which implies that such documents are not required for work executions.

Risk Management and priorities to meet the deadlines was another question under the Management Culture which was also replied positively by most of the companies and an average of 64.93% responded the need to manage risks even though there is pressure to meet deadlines. In Qatar it was understood from personal interviews and with personal experiences, most of the projects have stringent deadlines to meet whereas the planning gets toppled to changes in design, climatic conditions and certain non-availability of resources for construction. Wang (2016) states that a

precise plan for risk management shall be available which is detailed in risk tolerance; which is specific to workers, managers and associated stakeholders. However the clients or stakeholders stick to the deadlines without any flexibility due to whatsoever commitments which puts the Contractors in deep trouble to accomplish the projects. This endangers HSE due to the shortcut methods and noncompliance of safe procedures of work which potentially puts the employees in risk which is also a challenge to HSE in construction. The practice of safety risk management must be enhanced in the Qatari construction industry with more training, seminars, and workshops conducted by construction companies to familiarize employees about the concept of safety risk management (Senouci, 2015).

The question on need for accident investigation was also very positively responded by majority of the respondents (64.94%) which implies that there is a real need to investigate accidents and incidents proactively by the Management. This can result in non-recurrence of accidents and a culture to identify the root cause of the incidents and take preventive actions to rectify the Management systems. When accidents occur in construction sites, accident investigation is hardly undertaken that too wrong reasons. Investigation findings normally encompass an over attribution to 'chance', and a tendency for over apportionment of 'blame'. Haslam et.al., (2005) brings out that a key shortcoming of investigation processes related to construction accidents is pure absence of corrective and preventive action to avoid recurrences.

Conducting of HSE Meetings and site HSE tours by Management was also well responded clearly positive by majority of the employees (64.91%). Management inspections are quite inevitable for reducing risk levels. The Engineers and Managers who are qualified in engineering aspects whilst understanding of the HSE issues if not reacted timely to avert the possibilities of incident, could have a negative work culture at work places. This also encourages the morale and motivation of the employees who could contribute more towards HSE aspects and comply with the HSE policies and procedures. Such meetings and tours spread the message that HSE is the responsibility of all and not only HSE personnel where there will be a drive for good safety culture and all aspects are viewed with an importance to Health, Safety and Environment. Regarding attitudes of supervisors, Huang et al. (2004) states that Managers with greater safety awareness have the affinity to talk more and supervise workers greatly and with care.

Allocation of resources for HSE aspects was widely responded positively by most of the respondents (66.10)% which conveys that without resources, there will be no safety culture at workplace. Generally resources include the HSE staffing, infrastructure materials / services for H &S, measuring instruments, aid for trainings, inspections, risk reduction technologies and many other aspects. The responses though showing that resources are necessary, it depicts that many companies don't allocate necessary resources for improvement of HSE aspects. The management is responsible to allocate resources with the sufficient quality, level of competency and knowledge as a representation in each part of the work and this approach will respond the need of workers in terms of problem solving and preventing accidents (Pipitsupaphol and Watanabe 2000).

POSITION WISE REPLIES – MANAGEMENT CULTURE							
MGMT CULTURE	Director	Manager	Engineer	HSE Staff	Supervisors	Admin	Finance
YES	51.03	52.71	50.65	55.45	52.58	38.54	40.63
NO	48.97	47.29	49.35	44.55	47.42	61.46	59.38

Table 10.0 –Position Wise Replies (MC)

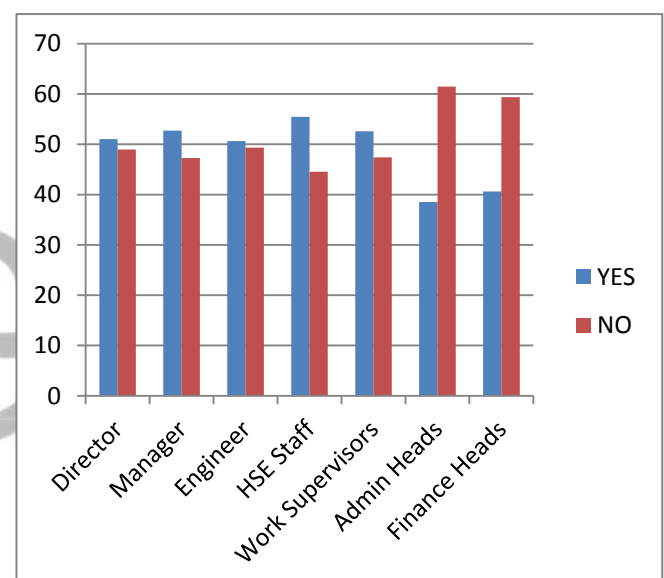


Fig 5.0 – Line Chart presentation –Position (MC)

COMPANY WISE REPLIES MANAGEMENT CULTURE (MC)									
MGMT CULTURE	SIS	UCC	CAQ	HLG	HBO	BEMI	QDVC	RCA	HDEC
YES	59.76	58.01	61.67	63.02	64.46	75	72.73	73.3	74.63
NO	40.24	41.99	38.33	36.98	35.54	25.00	27.27	26.70	25.37

Table 11.0 – Company Wise Replies (MC)

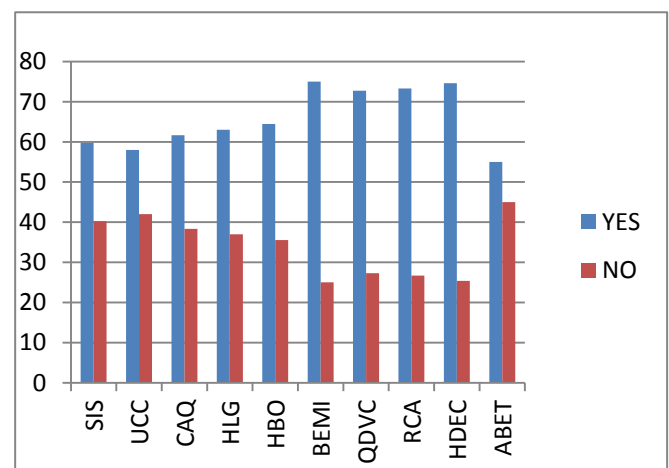


Fig 6.0 – Line Chart presentation- Company(MC)

5.2.2 Human Capital (Questions 9~17)

In this section, it was learnt in general that the negative responses (NO answers) superseded the positives (YES answers) which is a matter of concern and pose serious challenges to the HSE in Qatar's construction industry.

The question on recruitment policy for the employees was responded with a 65.07% as NO answers and 34.93% as YES answers which means that HSE knowledge and skills are not considered as a factor in the recruitment procedure. Knowledge and skill in Health, Safety and environment aspects could be vital criteria for employees working in an industry. If such levels are achieved during the recruitment phase, a culture could be evolved such that all employees undergo trainings during their earlier days of employment search which can bring them to a good professional who complies and understands the HSE requirements in the industry. This could be considered as one of the challenge in Qatar's construction industry which was clearly evident from the survey findings. Due to the prototype nature of construction projects, the transient work nature, under qualifications and illiteracy levels of the workforce are major contributing factors to poor safety records within the construction industry worldwide (Rowlinson and Lingard ,1996).

Supervision for construction works was responded with NO by 65.14% of the respondents which implies that works are not properly supervised by competent persons and workforce are at risk since they do not identify the potential risks and are unguided. Only 34.86% responded positively towards the requirement of supervisors for the works which also implies that currently there is an absence of work supervision which is one of the big challenges in the industry. It was also learnt that the available supervisors are not competent enough and just nominated from the worker category that doesn't possess a basic qualification or neither possess communication skills. Wang et.al, (2016) states that immediate supervisors have nearest contact and interface with workers, and the approach and method they emphasize on safety issues heavily contribute to risk tolerance of workers'. It could be learnt that the supervisor-worker ratio is also not maintained or considered by Construction Managements where few number of supervisors are deployed to monitor hundreds of workers scattered at multiple locations and levels which is realistically an impossible task to achieve. Hinze (1997) and Levitt & Samelson (1993) states that work supervisors who possess more personal and positive

relationship with workers display more favorable safety performance records; further this relationship is quite hard to develop should the ratio be too high, and that is the obvious case within construction sector (Smallwood, 2000).

HSE trainings for Managers were considered to be of less importance to the companies and hence the negative replies received for the question was 64.71%. This implies that the awareness on HSE for Managements is very low which could be a key challenge to the construction industry. Only 35.29% of the respondents were positive to the question and eventually the training for the management can be considered as a challenge to the entire construction industry in terms of HSE. Construction safety should be considered as a topic for studies to project managers with the tools they need to monitor and control changing trends in safety risks, thus reducing the occurrence of accidents on construction sites (Isaac and Edrei, 2016). If the managers have lack of HSE awareness and place it less important, the workplaces will lack controls for risk and hazard eventually leading to potentially a negative work culture and increasing ill health and accidents. Charehzehi and Ahankoob (2012) states that construction engineers and projects managers should be fully aware of hazards and prepared to deal with accidents when they occur and should be fully trained in H&S aspects.

65.23% respondents provided a NO to inclusion of HSE performance in appraisals and promotions. This clarifies that HSE has no role in most of the companies while during the annual assessment or evaluation. Hence the employees HSE performance must be linked to the promotions and up gradations in the organisation which can increase their attention towards HSE values. Potential HSE violators and other employees who non conform to HSE procedures may be least considered for promotions of grade levels and vice versa. Black points or negative markings may be given for each HSE violations committed which will increase the overall standards of the workplace and organisation. Only 34.77% responded positively by answering the question with YES which means that the ones who are complying to HSE are not regarded appropriately during the evaluation procedures and could be demoralized and tend to violate since there is no linking to their escalation to the career.

Workers welfare standards was also negated by most of the respondents (65.20%) which is to be viewed with due concern. Welfare is a factor which affects the morale

and motivation of the employees and it is detrimental for improving the culture and HSE standards of a work place or organisation. In construction industry, if the workers are not cared for their welfare issues, it affects their H&S which eventually could lead to incidents and poor work culture in a construction workplace. In HSE terms, welfare relates with facilitating provisions to maintain good health and well-being of individuals at workplaces and accommodations. All construction sites are purely temporary in nature; dynamically transformed as per changes and progress which is one of the key reasons behind H&S gets bypassed often on and off the workplace. Workers accommodations are also temporary dwellings and hence the living standards are often not looked after carefully and seriously by management. Traffic Management issues and incidents recur in construction sites due to the non-availability of a proper traffic Management system. The Health and Safety at Work Act of 1974 and construction (Health, Safety and Welfare) Regulations 1996 places a duty upon employers to provide information, training, instruction, and supervision needed for the protection and health of employees at work.

It was seen from the response for the question on the existence of HSE audits and inspections that 65.35% of the respondents was not aware of HSE audits and inspections which means that such procedures do not happen in the construction sites and hence the need and importance of these proactive monitoring systems is not made aware to the staff levels. 34.65% of the respondents were aware of the inspections and were positive towards conduct of such procedures. HSE Inspection is an inevitable part of the HSE Management system without which a system never operates effectively and there will be no continual improvement in the HSE sector which is also considered as one of the challenges to Qatar's construction industry. Most of the times, tools and instruments used for construction are not purchased in lines with quality standards which makes it more vulnerable to damage as multiple users work with them and most of them are not trained adequately. Inspection on such tools do not happen properly which leads to accidents in construction sites. A number of the accidents featured tools or equipment in poor condition and most of them are shared equipments, having multiple users, subject to heavy wear and tear (Haslam et.al., 2005) where scheduled inspection and maintenance are important.

In the Human capital factor section, the next question was on the adequacy of control measures adopted by the Managements on adverse summer climatic

conditions with temperature and humidity scorching high. Whereas it was responded that 65.42% did agree that their organisation do not have measures in place to mitigate Heat stress conditions at work place. This is also a breach of Human Rights and Ministerial Decision 16/2007.

64.82% of respondents did not consider linguistic and communication factors as important which is a gap in the Human Capital section. 35.18% responded positively which implies that there is a communication gap between the Senior levels and workforce that can lead to potential incidents at workplaces. Supervisory force cannot communicate with the workforce in terms of hazards, risk assessment, safe system of work procedures, lessons learnt from incidents. This could be considered a challenge in the construction industry where workforce is almost unskilled and lacks technical and professional knowledge. In cases of emergencies, if communication barriers exist, could lead to entrapments, lone workings and forced to incur injury or other sorts of catastrophic losses and casualties.

Another question on human capital was regarding promotion of HSE through motivational events, incentive schemes, award ceremonies which was unfortunately replied with NO answers by 64.77% of the respondents. Without motivation, achieving H&S objectives seems very challenging and those who follow good safety values and cultures tend to get demotivated due to lack of encouragement.

POSITION WISE REPLIES HUMAN CAPITAL (HC)							
HUMAN CAPITAL	Director	Manager	Engineer	HSE Staff	Supervisors	Admin	Finance
YES	41.87	39.07	43.5	45.02	35.69	38.43	34.72
NO	58.13	60.93	56.5	54.98	64.31	61.57	65.28

Table 12.0 –Position Wise Replies (HC)

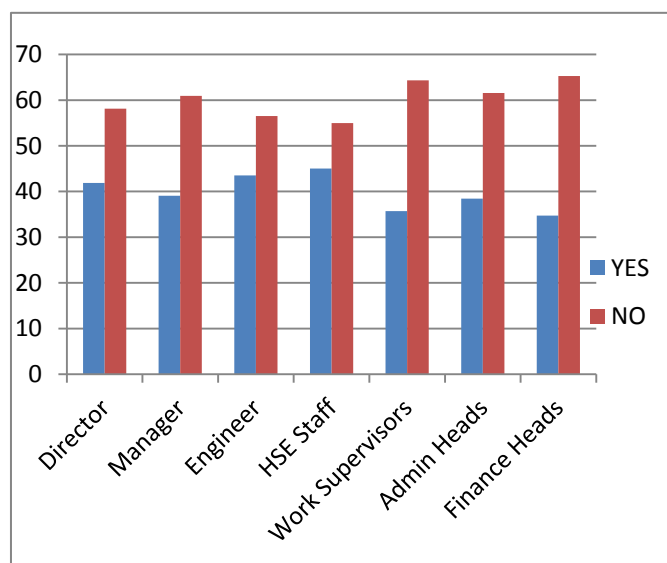


Fig 7.0 – Line Chart presentation –Position (HC)

COMPANY WISE REPLIES HUMAN CAPITAL (HC)										
HUMAN CAPITA	SIS	UCC	CAQ	HLG	HBO	BEMI	QDVC	RCA	HDEC	ABET
YES	31.17	36.64	37.96	37.5	28.57	25.4	35.17	31.96	40.1	44.74
NO	68.83	63.36	62.04	62.5	71.43	74.6	64.83	68.04	59.9	55.26

Table 13.0 –Company Wise Replies (HC)

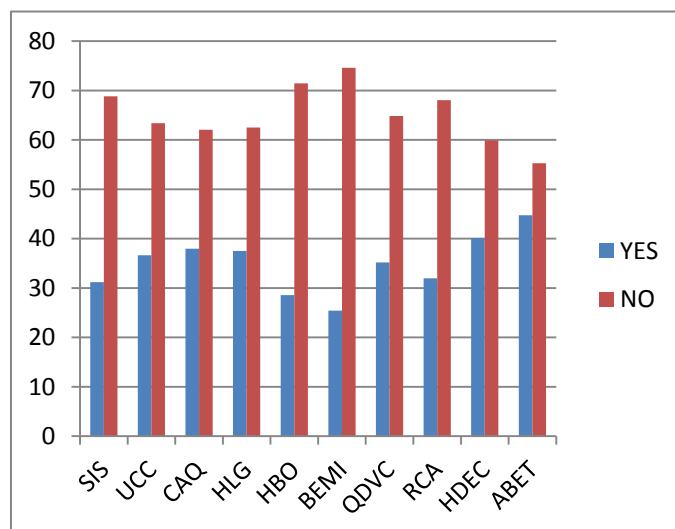


Fig 8.0 – Line Chart presentation –Company (HC)

5.2.3 Work Culture (Questions 18~20)

In Work Culture section one of the questions to the respondents was regarding the implementation and compliances to the safety policies and procedures in lines with the legal regulations which was positively replied by 67.18%. This implies that legal aspects are understood and complied by the companies whereas 32.82% replied as they were not complying to such regulations.

Environmental laws, policies, waste management and health standards are also responded positively by 67.92% of the respondents. However 32.08% responded that they do consider environment and health as important which is also a negative culture to the construction industry. Unsafe behaviors seem to be a combination of many factors, which include both the human and situational or environmental aspects involved in performing construction task (Choudhry and Fang, 2008).

The final question in the questionnaire was whether corrective actions are initiated by the Management for violators of H&S and refresher trainings or special trainings to offenders are provided which was answered with YES replies by 69.06%. However 30.94% respondents replied with NO answers which means that violations are not taken seriously and no such trainings for corrective measures are implemented by the Management of organizations. Discipline and training has a contributing role in defining management practices to enhance safety performance with provision of regular training sessions and disciplinary actions to increase the awareness of employees about hazardous tasks. Safety training is very useful as it

allows employees to predict future accidents or near misses (Charehzehi and Ahankoob 2012).

POSITION WISE REPLIES WORK CULTURE (WC)							
WORK CULTURE	Director	Manager	Engineer	HSE Staff	Supervisors	Admin	Finance
YES	50	45.58	45.99	69.3	41.97	44.44	50
NO	50	54.42	54.01	30.7	58.03	55.56	50

Table 14.0 –Position Wise Replies (WC)

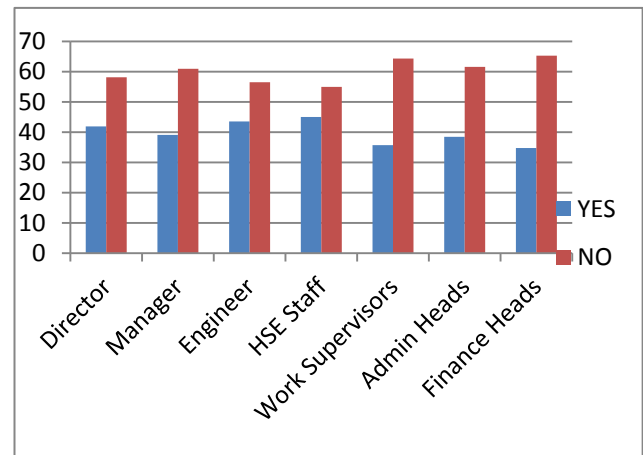


Fig 9.0 – Line Chart presentation –Position (WC)

COMPANY WISE REPLIES WORK CULTURE (WC)										
WORK CULTURE	SIS	UCC	CAQ	HLG	HBO	BEMI	QDVC	RCA	HDEC	ABET
YES	66.42	58.6	62.94	66.67	66.67	75	72.73	75	77.64	58.89
NO	33.58	41.4	37.06	33.33	33.33	25	27.27	25	22.36	41.11

Table 15.0 –Company Wise Replies (WC)

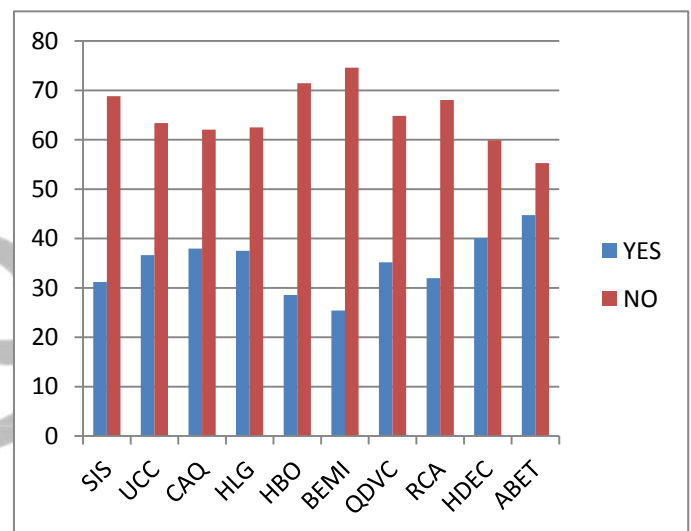


Fig 10.0 – Line Chart presentation–Company (WC)

5.3 Data Interpretation

From the study of the responses from company, negative replies (NO) from Human factors were found to be on the higher side than the other two factors. Companies like M/s Besix and Midmac (74.6%) was found to be lowest in the Human Factor section. Other companies namely M/s HBK 71.43%), M/s Salini (68.83%), Al Habtoor (62.5%) was found to be more which implies that even international contractors are non-complying with the HSE regulations. Some local companies like Al Bandary (55.26%) and HDEC (59.9%), though with less percentage but negated more on the Human Capital factors. It was again substantiated from the interviews with

Management's that Qatar's construction industry suffers serious challenges in terms of human capital; where safety is found to be most compromised followed by health, environment and welfare standards. This depicts that there are lack of preventive measures for reduction of occupational safety and illness on construction sites. Unfortunately Qatar's enforcement of health and safety regulations has not proven effective especially in subcontractors and supply companies. Some of the findings show that the framework of current conditions of occupational safety and health are disjointed and enforced inappropriately. The local legislations shall become tougher on the implementation and enactment of the law to the best possible depth and maintained / reviewed periodically with the active involvement of OSH enforcement authorities.

5.3.1 Data analysis – Company wise responses – Overall

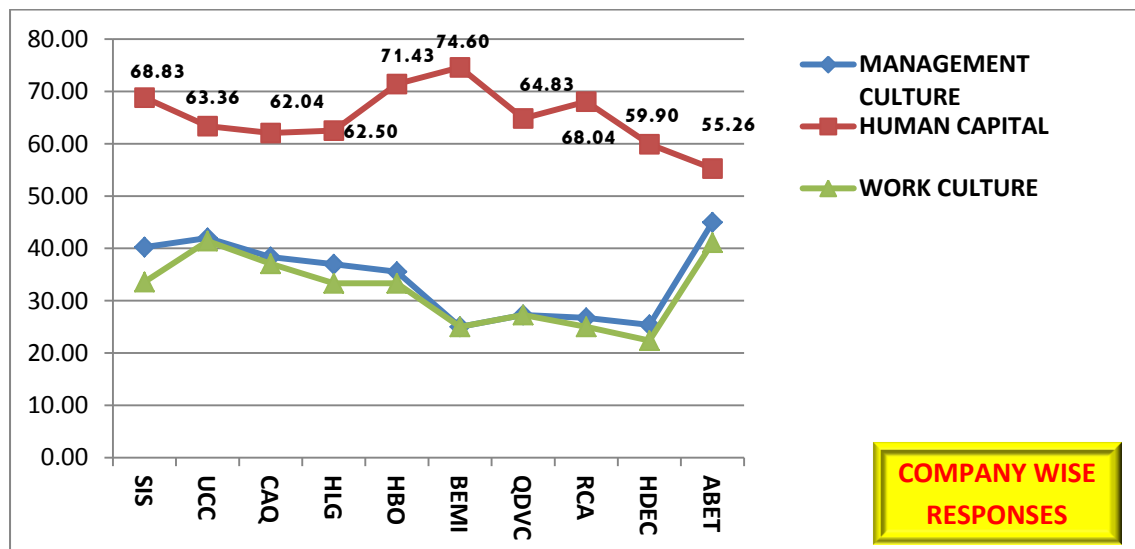


Fig 11.0 Comparative Line Chart presentation of results of company wise responses

The results obtained from company wise responses analysis (Appendix 'D') denote that factors under Human capital received most of NO answers followed by Management and Work Culture. This is found almost consistent with research by Al Hajeri (2011) and Saidani (2013) on the challenges faced by HSE in construction projects in one of the other Middle East country. The study also depicts that risks associated with works are transferred and more commercial gains pocketed by subcontracting of works where such subcontractors never consider OSH to be a part of their work or included in budgeting or scope of works. Hence Main Contractors possess HSE commitment but not ensure that it is implemented effectively in their

subcontractors which are not surprising since minor companies do not plan resources for a tall level of H&S performance and hence have poorer standards. Many occupational accidents and injuries are due to breakdowns in the existing OSHMS (Monk, 1994).

5.3.2 Data analysis –Position wise responses – Overall

The overall results in terms of position wise analysis (Appendix 'E') shows that top management remain committed to H&S and in papers. However negative replies were received from respondents for factors that were analyzed in Human Capital section, like lack of recruitment policies for HSE awareness (61.4%), Management training / HSE awareness (68.3%), welfare (57.7%) and motivational schemes (61.5%) were paid very less attention by senior level management. HSE staff responded almost positive to the questions in most of the sections.

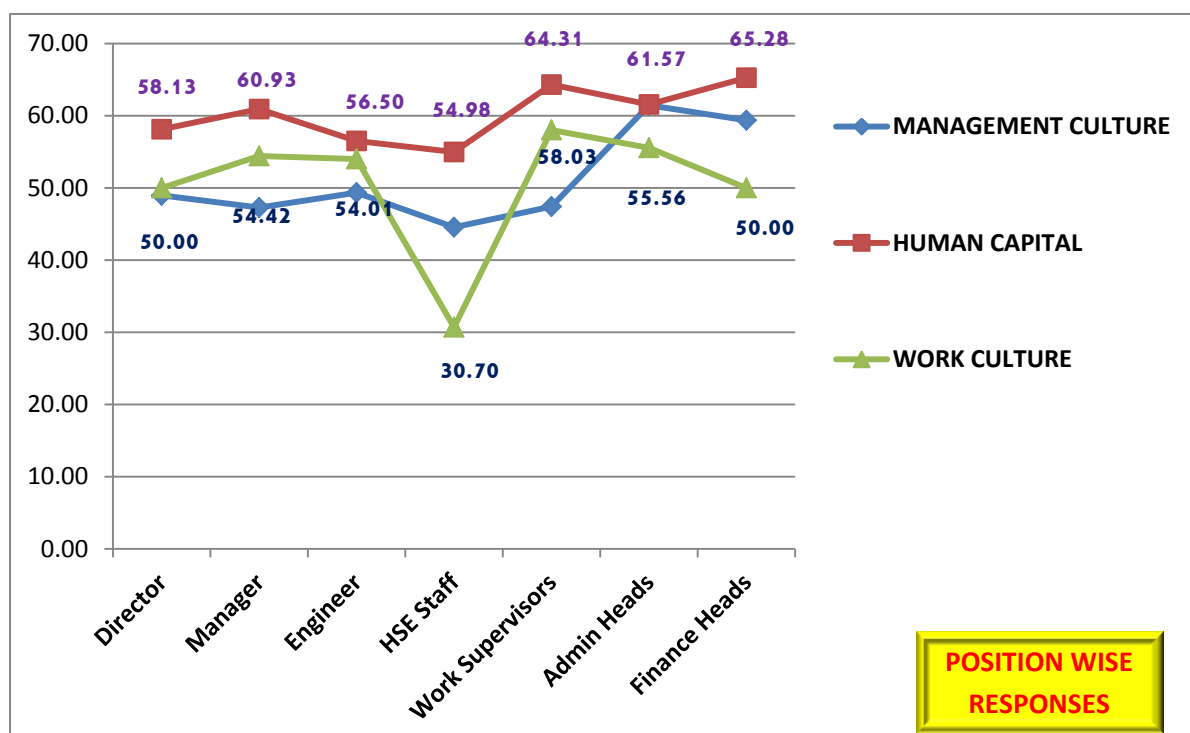


Fig 12.0 Comparative Line Chart presentation of results of position wise responses

During interviews, it was learnt that they lacked authority and even don't get a chance to participate in decisive meetings unless there is an accident or there is a major production delay. The Administration (61.57%) and Finance staff (65.28%) had provided almost negative answers to most of the questions.

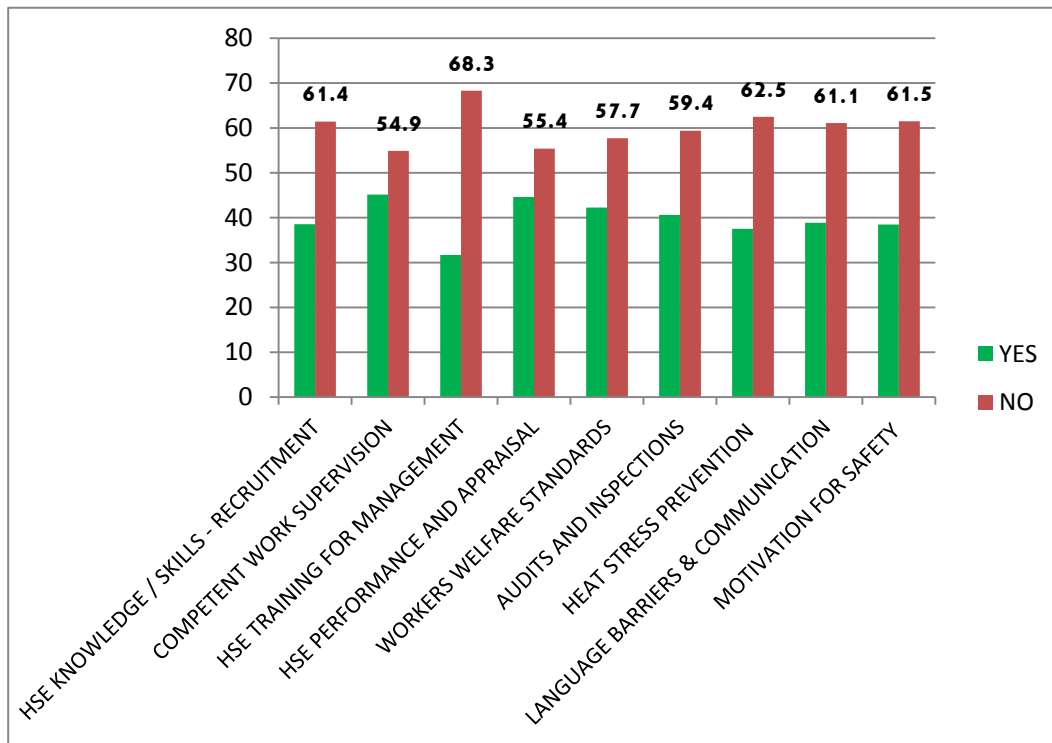


Fig 13.0 Comparative Line graph presentation of results of Human Capital

This is a clear evidence that resources for managing proper Health, Safety and Environment quite lacking and they just procure resources only when there is a pressure from the local authorities. This can be also seen as lack of commitment from the Management. In one of the question during interview regarding waste management and provision of skip boxes, a Finance Manager totally denied spending resources for skip boxes and it could be dumped on the ground and disposed by company trucks to some open lands which will not incur any cost. Such negative mentality and lack of awareness on HSE are great challenges to Qatar's construction industry. Line managements do have key role to play for having an effective outcome in improving positive H&S culture. It can be seen that properties in the Human Capital section like recruitment, training, inspections, supervision, and provision of welfare facilities; if addressed and taken care appropriately, the better will be the positive attitude and HSE compliance by the employees in the industry; which is directly proportional.

Chapter 6. Discussion

6.1 Discussion on identified findings

The following findings identified as challenges during the survey are discussed in detail as below:

6.1.1 Lack of training skills and competency

Frequent inconsistency in employee rotation and turnover added with trade job incompetency exists in almost all the construction sites which are among the primary challenges. Operatives' mobility is so high that they can hardly undergo job specific safety training at particular work places and on trade safety aspects. It is seen that the operatives are transferred or demobilized recurrently due to pressing demands and requirements but without mandatory orientations and job safety trainings. Management would be able to prevent accidents by identifying and taking the actions (e.g., safety training) that would improve workers' perceptions of safety and motivate them to practice safe behavior (Han et al., 2014). The acute deficiency of qualified construction craft and salaried professionals is the most likely threat to workplace safety according to survey respondents. 47% report that untrained and inexperienced skilled labor and worker shortages are a major challenge to the safety and health of workers and another 37% cite worker shortages as a minor challenge. As safety training increases, thus the degree of safety knowledge also increases (Goldberg et al., 1991) and positively influences worker hazard awareness and participation in safety programs (Zhang et al., 2013).

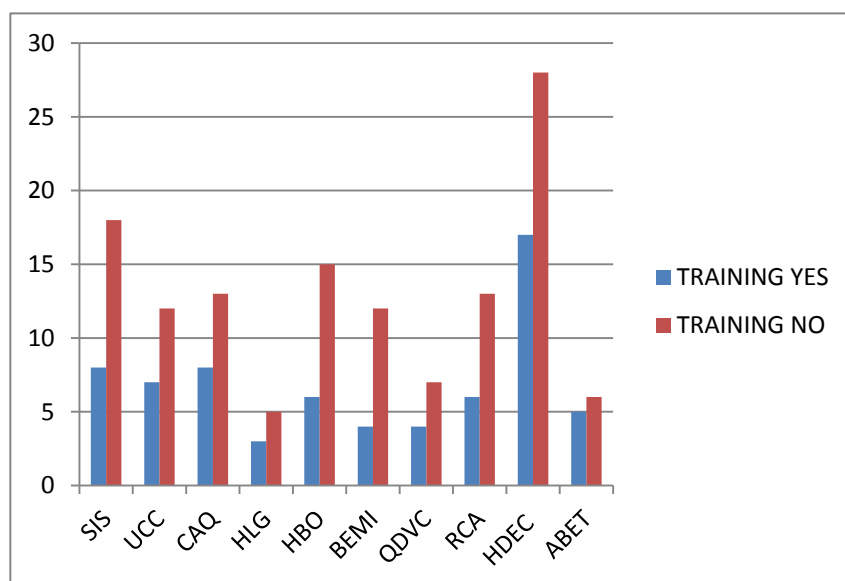


Fig 14.0 Comparative Line Chart presentation of results on responses to training

6.1.2 Inadequacy of competent supervisory force

Crew size refers to the ratio of supervisors to crew members. In general, a crew consists of workers and a first-line supervisor or foreman, whose role is considered critical for effective safety management (Han et al., 2014). The relationship between crew size and the accident rate has been studied extensively. The frequency of injury varies according to crew size (referring to Sugimoto, 2010) and the worker-to-supervisor ratio (Reason, 2016). Fang et al. (2004) also found that the worker-to-supervisor ratio has a significant impact upon safety performance. Törner and Pousette (2009) mentioned that increased contact with supervisors results in a corresponding increase in positive worker perception of safety—which can, by definition, refer to safety climate as shared and aggregated in a group level. Through management practices, field supervisors (e.g., foreman) play a critical role in preventing accidents. Kaskutas (2013), for example, examined the powerful impact that supervisors have on safety performance. Sawacha et al. (1999) also found that communication between supervisors and workers is strongly correlated with safety outcomes. Education level and safety culture of most of the 70% of workforce and supervisors who hail from Asian Countries are substandard where 45% of the human resources are either illiterate or have only basic reading and writing abilities and 72% of them are from countryside areas in their countries who do not have previous experience or training in construction works (Al-Tabtabai, 2002).

6.1.3 Lack of management commitment, training and resources to HSE

The commitment to HSE and welfare issues is displayed by developing and implementing performance based legislation for workplace H&S where performance objectives could be set and provision of a system with allocation of clear duties to embolden enhanced self-regulation for the construction industry. Such regulations are applicable to all direct and indirect contractors' along with their personnel and complete supply chain who are involved in construction activities. However, the management lacks awareness of the importance of HSE principles and thus they conveniently ignore the trainings and associated programmes for HSE. Research on the effectiveness of training helps to identify ways to improve safety management, particularly if managers are provided with an understanding of the relationship between training and safety improvement; for example, training is positively related

to the improvement of safety participation, awareness, knowledge, behavior, and motivation (Zhang et al., 2014). He further adds that HSE programs need to be consistent and continuous with regular inspections by competent persons are to be conducted for workplace, materials and equipment. HSE training enable one to instruct employees for working safely and get be aware of HSE regulations to prevent possible hazards. Investment in H&S might be particularly susceptible to cuts in the aspect of financing restrictions since its payouts accumulate gradually over time and are difficult to gauge. Expenditure on HSE is to be financed from either internal cash flow or externally raised capital but in the current scenario, a firm's investment may be sensitive to the financial resources available to finance that investment. Hence, H&S of companies' workplaces can depend on the financial resources at its disposal (Cohn & Wardlaw 2016). If investment in safety is sensitive to a firm's financial resources, then injury rates should decrease with cash flow and cash balances and increase with leverage (Hochberg & Rauh, 2012).

6.1.4 Lack of investigations and reporting of incidents / accidents

In construction industry due to many factors and lack of proper systems and moreover due to dynamic work nature, accidents do happen which are normally to be reported but Contractors do not follow the procedure of reporting and investigation. Snyder et al. (1991) mentions that the itemized objectives communicated to employees on reporting of injuries and ill health are not always perceived realistically by the workers; where most of them don't understand the core of the message. This is understood to be to maintain a good HSE statistics and to keep the name and fame of the company to high scales. Eventually such acts lead to recurrence of similar accidents with more severity and probability. Every incident should be investigated to identify the immediate and root causes and to determine how future accidents can be avoided. Several causal accident models have been defined in the literature, and systems thinking has been generally used to explore the causality of a lack of safety in these systems (Goh et al., 2010; Larsson et al., 2010; Leveson, 2011). One of the axioms of accident investigation is that accidents are the outcome of failure to operate OSHMS properly and with efficacy. These management failures such as faulty design or non-provision of resources, training and non-prevalence of HSE culture are not mostly identified which is one of a potential challenge. Failure to collate data for near misses; without sufficient quality and quantity; would limit attempts to conduct sensible analyses and to design

concrete corrective and preventive actions. Contractors are concerned about the time factor and delay caused for investigating accidents which could hamper progress rate of construction. Hence, contractors tend to avoid reporting of incidents and are benefitted by both parties by achieving steady progress, avoidance of delays to the project, escape from litigation and management effort in investigating incidents; and to put apportion of blame to someone. Van der Schaaf, (2005) states that accidents need to be viewed as opportunities to escalate management systems to more improvement and not as opportunities to blemish someone. Reporting is to be encouraged at all levels which can increase the efficacy of prevention methods and prevent recurrences in the future. Lingard and Rowlinson (2005) explains that incident reporting could greatly aid for evaluating the effectiveness of prevention strategies and a key primary step to prevention such in the future.

6.1.5 Poor living conditions and welfare of migrant workers

The total population is 2.2 million out of which 1.4 million are migrant workers, generally from countries like Nepal, Srilanka, India, Pakistan and other south Asian countries (Ministry of Labour statistics, 2013). The condition of migrant workers in Qatar paints a fairly dire portrait of the living conditions and labor relations faced like passport confiscation, lack of documentation, job switching, salary withholding, and problems related to labor camps and living conditions common to low-income foreign workers in Qatar and the neighboring states (Gardner 2013). Inadequate sewage and ventilation, substandard drinking water, sleeping facilities and unsanitary food preparation areas are common. These conditions create ideal incubators for disease acquisition and spread (Mohammad and Sidaway, 2016). ITUC (2014), HRW (2012), Amnesty (2013), and UN (2014) reports reflect that workers are promised one wage and provided with another, that additional costs have been forced upon them, that the working environment is more hazardous than they are aware of, and that they have very few legal rights. The workers camps are situated too far from the workplaces, which necessitate them to travel for long time in non-air-conditioned transports to and fro and especially in extreme weather conditions, it becomes a nightmare. This travelling has a detrimental effect to their work and sleeping conditions which is a major challenge to H&S of the migrant workers. Living conditions of workers are mostly in filthy conditions where occupational diseases and health borne from the workplaces puts the migrant workers fall into the category of

chronic patients for incurable diseases. Occupational health literature links continued exposure to the type of schedule mentioned above to chronic fatigue and long-term health problems such as increased risk of cardiovascular disease, diabetes, depression, anxiety, and injury (Estabrooks 2009).

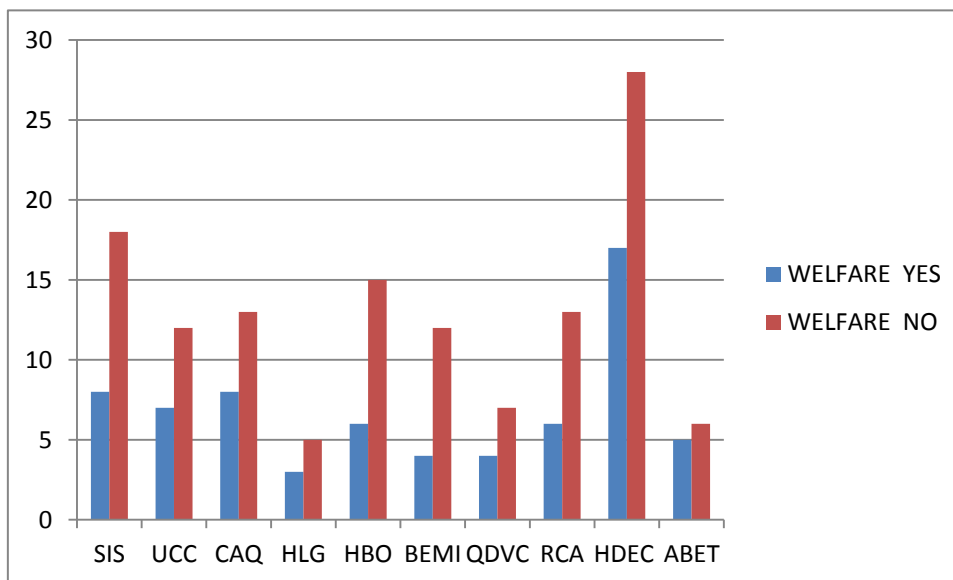


Fig 15.0 Comparative Line Chart presentation of results on responses to welfare issues

6.1.6 Communication gap and language barriers

Language barriers remain another challenge for Health and Safety where the perception levels of trainings remain ineffective due to the poor education levels of migrant workers, lack of perception levels, non-provision of multilingual training materials and there is no primary screening for deafness and hearing levels. Thus the training effectiveness also is a challenge in the industry. For tackling language and literacy issues, HSE has to develop proposals to engage the workforce (HSE 2003). The challenge of converting the health and safety systems to accommodate a multi-national / cultural workforce is to be addressed using initiatives such as, translation of health and safety materials, use of interpreters and an increased use of visual methods for communicating health and safety messages (Bust, 2008). In Qatar's construction industry, HSE practitioners do encounter communication barriers due to the multi-language diversities occupied in various disciplines and hence this barrier can be overcome only if the HSE employees are proficient in thoughtful communication processes. Together with the growing international activity in construction there has been an increasing awareness of the importance of better

understanding of cross-cultural management (Torrance, 2004), as the workforce may be drawn from many different countries, use many languages and have a variety of cultural backgrounds. Culture frames the ways in which we express ourselves (Bust et al., 2008) and the way others actions are to be interpreted. Research by other countries of GCC, who utilizes migrant workers, testified that whilst volume of migrant workforce increases; such diversified cultural and traditional traits of labour replicate on anthropological relationships, diverse task behaviors and allied issues with communication. Moreover, they turn vulnerable to emotions and thoughtful with their issues which could adversely impact workers' attentiveness and devotion and may lead to mistakes (Csikszentmihalyi, 2014). For an effective and successful communication in a diversified regional working environment, it is essential for HSE staff to understand fundamental cultural and linguistic challenges. HSE professionals are to be more proactive in multi-language worksites since this challenge will only continue to grow (Cooper et al., 2015).

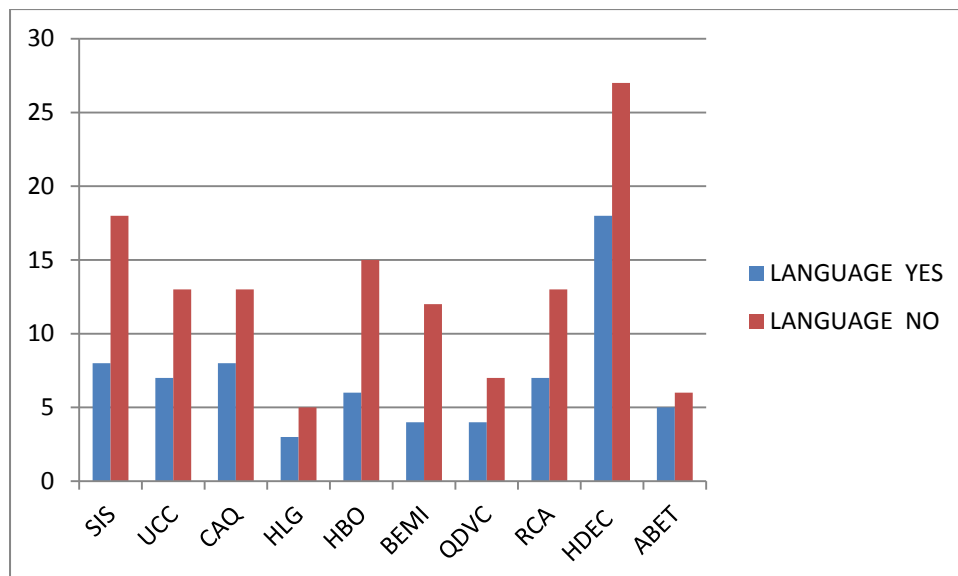


Fig 16.0 Comparative Line Chart presentation of results on responses to language barriers

6.1.7 Lack of competent inspections and audits

Audits and inspections for HSE are active leading indicators (Hinze, et.al., 2013) Active leading indicators are those which are more subject to change in a short period of time. Construction site works do possess a nature of continual change of procedures, equipments, workforce and location and hence the need to inspection the workplaces are vital in maintaining a healthy and safe working environment. According to general H&S provisions, it is the employer's responsibility to develop

programs for safer work conditions for their employees. These programs should cater for consistent job site inspections, materials, and equipment to be made by competent personnel. As per Ng et al., (2005), HSE training and legal awareness develop a responsibility to employers to avail himself of such programs and advice every employee regarding unsafe work conditions and applicable laws to work environment which can prevent possible hazards. HSE audits are critical and systematic examination of the management system and it gives light on the strength and weakness of the system in terms of field conditions and system control. Normally, it involves a process of checking the actual working conditions against the standard procedures which are normally bypassed by most of the construction sites to achieve targets within proposed dates of completion. This paves way for increasing accidents and ill health and damage to environment and eventually to a negative HSE culture.

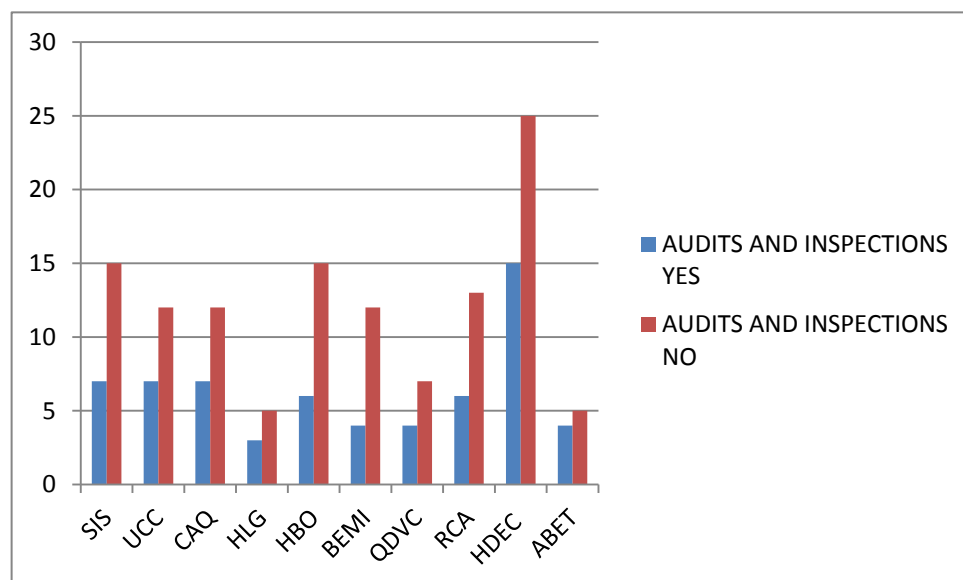


Fig 17.0 Comparative Line Chart presentation of results on responses to audits and inspections

6.1.8 Lack of risk assessments for Critical works and Poor Safe system of work (SSoW)

Qatar's HSE arena is encountering challenges continually in multiple magnitudes which is escalating the rates of accidents leading to occupational fatalities, LTI's, acute illnesses; some of which are neither reported nor recorded. Piper (2014) states that thousands of workers die in Qatar but there is nothing that proves these deaths are related to the construction of the World Cup and those are just expected fatalities

from natural causes as one representative from the Indian Embassy states that the death statistics in the media are used in an “inappropriate manner”. High rate of incidents, illnesses including disabilities do exist and are recurring in Qatar especially originated from Construction sector. The majority of migrant workers return to their home countries after serious injuries or disabilities, if they have no family support in Qatar (Hassan et al., 2014).

6.1.9 Production first, Safety next – Conflict between safety and production

A common clash between production and occupational safety and health (OSH) is visible in much of the Gulf region. In construction, safety is also an integral component of a construction project that cannot be isolated from other project elements (e.g., schedule, cost, and quality) (Erik, 2010). Over the years in almost every industry where production is involved and where safety regulations, procedures and processes need to be tailed, there has always been an apparent conflict between safety and production. High demands on production and expansion come at a cost. In many instances, it is inevitable to suspend production to necessitate such mandatory legal requirements; where valuable operational delays and consequent production losses of such periods have usually propelled a reluctance to carry out such safety operations (Rasmussen, 2012). This perception has largely fuelled an ad hoc attention to safety requirements. Since the probability of loss can be identified with the firm's margin of safety, the rules can be viewed as alternative ways of making a compromise between expected profit maximization and high safety margins (Ali et al., 2013). Also proving the culpability of most organizational management in this perception is the tendency to haste and oversee safety precautions whilst setting up new sites and facilities which leads to accidents or technical errors which were avoidable, should properly risk analysed and assessed. This perceived conflict between safety and production, poses a very great risk to the industry if not the greatest!

6.1.10 Subcontracting of task – Risk transfer

Outspreading and articulating subcontracting in construction, which is a normal practice in Qatar and which is booming as part of the current upsurge in construction

has brought out escalated risk levels at work place since the principal contractor transfers his risk to the subcontractor whereas the latter do not have systems in place to manage risks. Subcontracting increases the risk of on-site injuries by shifting risk to contractors with a higher tolerance for injuries and by creating an environment where lack of cross-contractor coordination increases the dangers of construction work (Azari, 2015). Majority of contractors are concerned about the HSE performance of their subcontractors where 18% of contractors' list poor subcontractor HSE performance as major concerns and another 47% said it was a minor concern. Much of the concern about subcontractor performance is likely connected to the same workforce worries that contractors cite for their own safety challenge (Al Hajeri 2011). Subcontracting is associated with poor occupational health and safety outcomes, and an erosion of safety standards (Long 1999). Subcontracting escalates the injury risk by transferring task to further smaller firms who are not in a position to afford the fixed costs of safety programs while they can more afford to go out of business. The increase of competition levels among contractors and the razor-edged profit margins, HSE is not considered as an aspect of their business and never bother to invest into it, which is considered as 'costly or expensive'. Despite its economic benefits, subcontracting also has an adverse influence on health and safety (H&S) which continues to persist in the construction industry (Loosemore and Andonakis, 2007; Yung, 2009).

6.1.11 Meeting deadlines for work completion

As progress deviation increases, workers are encouraged by management to complete their work within the contract time. The resulting production pressure (e.g., being pressed to work faster) adversely affects safety performance (Goldenhar et al., 2003; Mitropoulos and Cupido, 2009). A successful construction project must meet performance and delivery requirements for time, cost, quality, and safety. It is not unusual to observe that actual schedule and quality performances are different from planned performances (e.g., schedule delay and rework) during a construction project. Such differences often result in production pressure (e.g., being pressed to work faster). Previous studies demonstrated that such production pressure negatively affects safety performance. However, the process by which production pressure influences safety performance, and to what extent, has not been fully

investigated. As a result, the impact of production pressure has not been incorporated much into safety management in practice (Han, 2014).

6.1.12 Temporary works without basic standards

In construction sector, for any permanent works to be undertaken the entire construction phase has to be supported by temporary working platforms, facilities and other associated infrastructure. Temporary works in construction are done without any proper planning and safe systems since there are no inspection and quality requirements to be met. Most of the incidents in construction industry occur from the temporary and reworks those results from quality deviations (Wells and Hawkins 2014) and a major contributor to production / schedule pressure, which consequently degrades safety management (Park & Pena-Mora, 2003). The pathway from concealed, organizational catastrophes, like poor design and planning in temporary works are vulnerable to dynamic failures (workplace errors and violations) was highlighted by Pintelon and Michiri (2009).

6.1.13 Adverse Climatic factors

Al-Tabtabai (2002) states that 52.6% of the construction accidents happened in summer, 33.8% in winter and Gulf countries is very hot during the summer seasons and tends to extremely hot during the months from May to September where temperature and humidity are extreme and H&S of workforce are jeopardized due to heat exhaustion and dehydration. There are various environmental and climatic factors that turn detrimental to construction industry; temperatures and atmospheric index soar too extreme especially in summer season. In summer, between April and September, temperatures can reach 131°F in the shade with humidity levels exceeding 80 %; workers often stay in this heat for up to 14 hours per day (Adhikary, 2011). Heat-related illnesses are also a concern in the Gulf, especially in July and August when temperatures regularly soar beyond 100 °F (38 °C) with humidity in excess of 80%.(Adam Neave, 2014). Qatar region and around is one of the parched areas of the world where daily average temperatures in the month of August reaches up to 46.8°C (Sadiq & Howari, 2009). The harsh work environment and the high workforce turnover negatively impact jobsite safety (Al Abbadi, 2015). In winter

months, wind transmits heavy volumes of sand added with fine dust leading to dust loading in Qatar and adjacent nations (200 mg/m²) which is ranked as global highest after Saharan Africa (De Longueville F et.al., 2010).

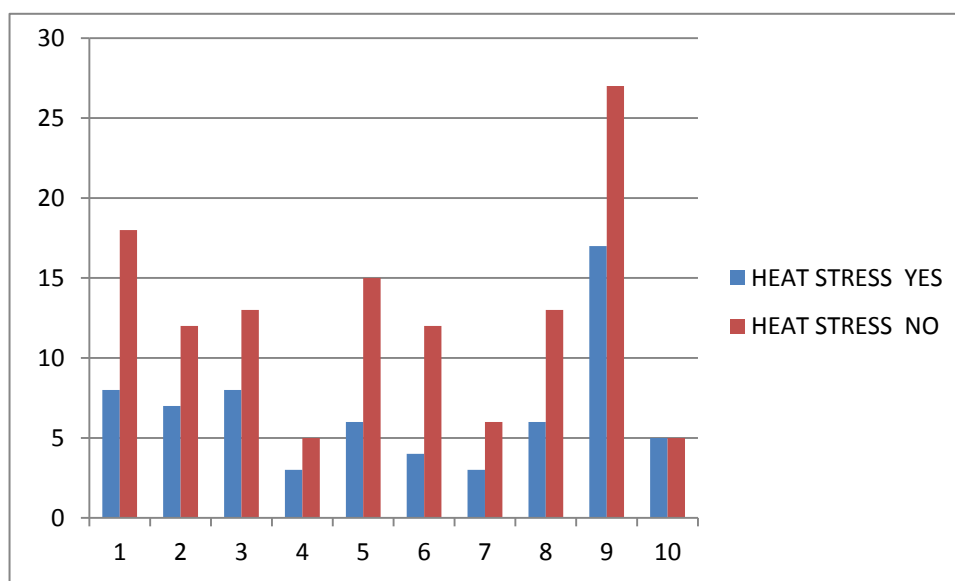


Fig 18.0 Comparative Line Chart presentation of results on responses to heat stress controls

6.1.14 Environmental and Sustainability concerns

Construction waste accounts for more than 80% of all solid waste in Qatar and the majority is landfilled in the desert outside the capital, Doha, contaminating an increasingly large area of land (MDPS 2014). The 2022 construction programme results in the production of large volumes of construction, demolition and excavation waste (Reid et al., 2015). Waste and Resource Management reported that 55% of all construction, demolition and excavation waste was recycled as aggregate or soil (Defra, 2012) and in Qatar, all the construction waste is sent to landfill with almost zero recycling. The high volume of utilization of natural resource isn't sustainable which can compromise the environment for growth sake. Both climate change and management of hydro resources are two key environmental issues which poses mounting challenge to construction sector. For rapidly developing countries in the world, achieving targets for reduction of global CO₂ emissions would be a major challenge for construction energy. This could be achieved only by requiring a positive and new approach to project Management for smarter planning and design sustainability which could possibly reduce energy consumption and pollution. The adverse effects of this uncontrolled landfilling on the environment are causing

concern. The landfilling is also a waste of a valuable resource, as much of the material could be recycled as aggregates (Wu et al., 2014).

6.2 SWOT Analysis

	INTERNAL	EXTERNAL
POSITIVE	<u>Strength</u> <ul style="list-style-type: none"> ➤ Contractors aware of HSE issues ➤ Contractors aware of the legal requirements ➤ Willing to deal it effectively ➤ Aware of the consequences 	<u>Opportunity</u> <ul style="list-style-type: none"> ➤ Qatar is exceling in construction industry and can use the situation advantageous to win new projects. ➤ Contractors could use the legal implications (QSC 2014, Ministerial decisions and other new statutes) to allocate budgets for implementation of HSE regulations. ➤ Contractors could participate in internal races to prove their HSE commitment through media. ➤ - Many qualitative and economic HSE training centres are readily available to train their employees.
NEGATIVE	<u>Weakness</u> <ul style="list-style-type: none"> ➤ Lack of communication of management policies down line ➤ Lack of involvement of local enforcement authorities unless an incident is reported. ➤ Weak role of consultants to elevate HSE issues to Contractors management ➤ Complicated legal procedures in recruiting competitive personnel for the tasks. ➤ Limited visa quotas for certain countrymen which restricts them to get employment. ➤ Non recording of accidents and non-reporting ➤ HSE Management not included in the core management and decision making groups. 	<u>Threat</u> <ul style="list-style-type: none"> ➤ Non- Identification of root causes of incidents ➤ Current political crisis and embargo in Qatar ➤ Forgery of certifications which are not identified properly ➤ Loss of name and fame of Contractors ➤ Working overtimes to meet deadlines with less attention to health ➤ Lack of designated waste disposal lands which poses threat to environment ➤ Threat to HSE staff employment (termination) if production is hampered due to safety implementation reasons.
SUGGESTIONS	<u>Suggestions for improvement in HSE</u> <ol style="list-style-type: none"> 1) Increase surprise inspection by government bodies like MoL and MoE and local stakeholders to construction sites 2) Every occurred near misses, incidents and accidents to be investigated and reported to Management 3) HSE Committee to be established and convened every month chaired by Project Director 4) Subcontractor selection should be purely on the basis of HSE credentials and previous performance. 5) HSE budgeting should be considered with priority 6) Effective HSE trainings should be conducted at all levels. 7) Records of RA, incidents are to be verified by Management representatives periodically. 8) Consultants are to be competent and experts to drive contractors successfully. 9) HSE review should be conducted effectively. 10) HSE Management should be part of core management. 	

Table 16.0 SWOT Analysis of contractors who participated in surveys

In order to analyze the strengths, weaknesses, opportunities and threats which prevail in the present scenario of the construction industry which were gathered through questionnaire and interviews, a SWOT analysis was carried out. This is a key tool for critically and systematically examining a company, its system and environment. In this analysis, strengths and weaknesses are internal factors

whereas opportunities and threats are external. On the basis of the findings, a SWOT analysis is generated with the inclusion of all companies who participated in the research survey. It would be useful for the Contractors in the State of Qatar to ponder on their weaknesses and exploit the offered opportunities.

6.3 Summary of findings

SUMMARY OF FINDINGS FROM QUESTIONNAIRES AND INTERVIEWS	
No.	PRIMARY FACTORS
1	Poor recruitment methods for employees where HSE knowledge and skills are not considered
2	Lack of competency for supervisors and other potential workforce.
3	Lack of HSE training, awareness for Management and hence no trainings organized / conducted down line.
4	Measurement of safety performance not considered for employees evaluation and appraisals.
5	Lack of motivation for employees due to poor living conditions and inadequacy of welfare standards on and off site.
6	Failure to conduct proper and routine audits and inspections at workplaces
7	Failure to take controls for Heat Stress conditions and workers health leading to sickness and ill health and injury
8	Non-consideration of language barriers where operatives from multiple nations and culture work together without proper communication and understanding.
9	Non – conduct of motivational programmes for enhancement of HSE skills and improvement of workplace safety culture.

No.	CONTRIBUTORY FACTORS
1	Lack of Management Commitment and non-availability and unawareness of HSE policies in the organization
2	Selection of substandard subcontractors for sake of commercial gains and transfer of contract risk
3	Failure of investigate accidents for prevention and recurrences and non-reporting of incidents
4	Non allocation of adequate resources for HSE issues thereby saving cost for the organization
5	HSE not considered in Management meetings and absence of site safety tours by site Managers.
6	Non conduct of Risk Assessments and no proper planning and methodology for even critical work executions.
7	Lack of enforcement from local authorities and non-conduct of HSE inspections by government authorities
8	Lack of imposition of disciplinary actions to violators and non-consideration of safety promoters.
9	Environment protection is not considered appropriately at work places as per required standards leading to sustainability concerns

Table : 17.0 – Summary of research survey findings (Primary and Contributory factors)

Chapter 7. CONCLUSIONS AND RECOMMENDATIONS

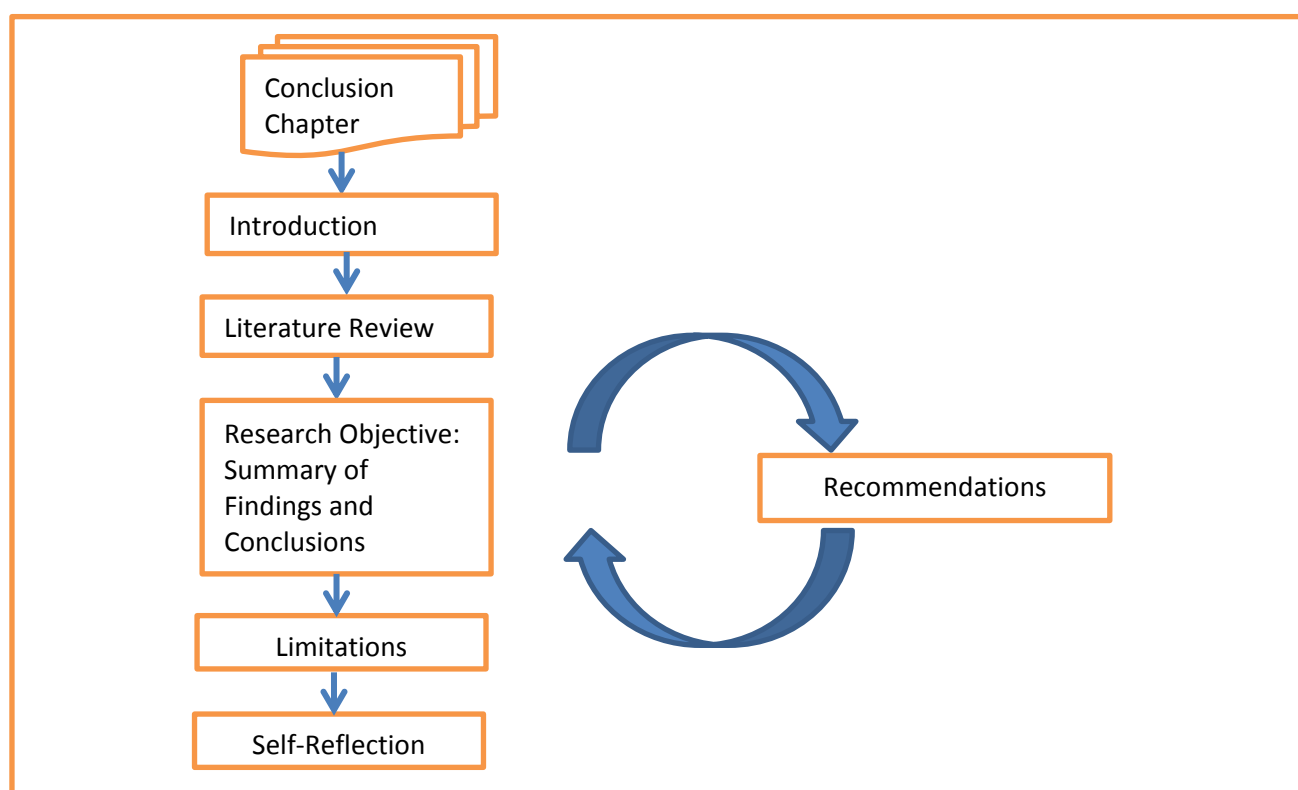


Fig 19.0 Structure of Conclusion Chapter (Biggam 2011)

7.1 Conclusion

The research survey has met the aims set and achieved the objectives of identifying the challenges faced by HSE in Qatar's construction industry. The importance of Health and Safety is much known by the Construction Management and Project Heads and there is a trend to improve good health and safety standards. However, there is a prevalent lack of health and safety culture which heavily contributes to the 'braking effect' for continual improvement and hence the implementation rates are not steady. Whilst understanding the 'good and bad', the not-so-positive culture tends the situation to drive the standards rearward in some of the influential companies. Local companies are in the forefront for winning more projects and do succeed in their attempts and there exists a 'positive market' for Qatarization and promotion of such Contractors. Nevertheless, such companies are comparatively displaying a poor performance in the Health and safety aspects. Human capital has been found very negative in the H&S aspects where even some cases, the higher management lean towards commercial gains since the competition in the industry is quite high and win projects for razor edge marginal profits. Qatar does not have a

glorious past and is a booming nation where all round improvements are done for a facelift to become a pioneer in the group of reputed nations. There are some powerful incentives for organizations to strive for high H&S standards which are moral, legal and economic. Supervision is one of the important areas to be focused where workforce is occupied in an unguided and unsafe manner where they often undertake risks, sometimes willingly and sometimes forcefully. Supervision from government or supervisor may lower workers' willingness to take risks, then lower their risk tolerance (Wang et.al.,2016). The industry has undergone a sea change by significant growth and advancement and its crucial for both employers and employees to become more conscious of H&S. As the global network transforms into more inter-connected and work places turn progressively diverse, confirming effective education and awareness, development and adoption of H&S top practices among both levels of employers and employees, on and off work places are to be considered essentially important. The high rate inflow of migrant employees to the country without any basic knowledge in H&S added with poor recruitment policies pose a big concern. Even after inducting into the work the Managements are not keen in improving their qualifications and training levels and focus mostly on progressive construction and meet deadlines to move forward. Non-reporting and non-investigating of ill health cases and severe injuries also endanger the workforce and lower the motivation levels. Non-recognition from the Management and government despite following good practices and maintaining acceptable standards is also a major concern and challenge for promoting H&S values.

Being a multinational work environment, provision of employees with understandable information on their own health, safety, rights and obligations could increase the awareness for compliance. Creating accessible means of communication of multilingual OSH information to all levels of associated construction operatives could turn the things in a positive trend. Enhancement of competent supervision and steady control of workplaces can significantly increase H&S standards in the industry. In terms of welfare and health, adopting climatic controls for comfortable working and living especially in summer seasons where heat index crosses 55 most of the peak times of the day is also a important aspect to be addressed by every employer. Working under direct sunlight in peak summers exerting to outdoor tasks in extreme heat conditions is crucial for especially construction operatives in State of Qatar. New innovative and technically approved but cost-effective pragmatic

solutions that are available in the market or else an adaption of the current concepts and technology are required, to those which uses personal protective equipment (PPE) in a proactive way to reduce the heat and humidity impact by controlling or dropping a person's temperature. Conducting health surveillance for employees shall be a part of Managements role and proper tracking and necessary follow up need to be exercised with strict enforcement from legal authorities.

A major drive from the managements and their demonstration of commitment towards the implementation and improvement of HSE elements plays a crucial role in the compliance and performance by employees. It was learnt from the survey that subcontractors neither allocates resources for operating HSE system effectively nor display weak commitments to improve their own health and safety performance which implies that standards of HSE are not considered much imperative in business practices. The research has also thrown light into the fact that suppliers and small subcontractors are under the shadow of Principal Contractors when it comes to HSE issues and do not have their individual systems or standards, though they are pre requisites to run the company. Moreover, the industry runs with the aid of hundreds of small such firms who form the lions share in the construction business and hence the overall HSE standards always tend to negate the growing curves downward all the time. Currently government regulations have been made stringent but applicable for the global Contractors from developed nations of the world. The regulations impose considerable pressure on all firms, large and small, to protect the construction workforce but the efficacy is not found suitable.

7.2 Recommendations

According to the summary of findings (Appendix 'F'), the following are recommended as below:

- i. Recruitment policy needs to be revised by organizations in the industry with the inclusion of H&S knowledge through examinations for recruitment process regardless of his/her proficiency in trade knowledge and other credentials.
- ii. Work permits are to be made compulsory in every workplace and to be linked with the persistent presence of competent supervisors and HSE staff. "NO supervision, No work" policy is to be strictly implemented or else lead to closure of work permits.

- iii. Prior to commencement of works at site, all levels of employees need to undergo HSE trainings and be customized to site safety regulations which is to be refreshed as per the significant changes in the workplace.
- iv. For evaluation and annual assessments, HSE performance of all level employees shall be considered as an important criterion. For potential offenders, negative points shall be applied and bonus marks for those who contributed for the HSE and welfare aspects of the organisation on and off site. Such bonus points need to be publicized for wide communication among all employees.
- v. Workers welfare standards shall be considered as a prime commitment by the management and regular audits and inspections need to be undertaken at workplaces, transportation, dining, recreation and accommodation facilities to increase the motivational factors which could go a long way in displaying good HSE culture.
- vi. All workplaces shall undergo Daily HSE inspections by competent staff and reports shall be generated where it is vetted and tracked for rectifications and follow ups. Key performance Indicators are to be developed for unsafe acts and conditions and measure the trend analysis of the workplaces and human behavior towards HSE aspects. Comparison of data has be made and progress is to be measured with identification of potential issues and subsequent trainings on the critical issues need to be regularly conducted and cascaded to the higher management. Records of such trainings are to be in place by each individual which shall be checked by inspectors prior to signing the work permits as having the knowledge to undertake the task safely.
- vii. Necessary heat stress prevention control measures and awareness trainings are to be imparted by every construction organisation and worksites for employees occupied especially in outdoor activities. Health surveillance are to be conducted and tested whether they lack some health parameters to execute work in hot and humid conditions especially working at heights and confined spaces. Suitable quality rehydrants, engineering and administrative controls are to be adopted at such work locations and are to be controlled with work permits. "NO Heat stress controls, NO Work" policy is to be strictly implemented.

- viii. Communication is a key to positive HSE culture where language plays an important role. In a country like Qatar, 98% employees out of which 100% workforce are from various countries where there are no matches in language and culture. This challenge should be overcome by implementing communication regime through understandable languages without which risk communication is not disseminated. Other communiqués on the subject like HSE alerts, bulletins, lessons learnt from incidents, best practices guides, Risk assessments, hazard analysis, emergency response arrangements, workplace hazards, signage communication are to be communicated properly to all operatives occupied in the workplaces.
- ix. Motivational schemes promote safety culture and there should be HSE programmes conducted like campaigns, safety competitions, award ceremonies, health checkups, environmental awareness lectures, movie presentations, distribution of safety culture embossed personal wears / utilities and other incentive schemes on a regular basis.
- x. The research findings also implies organizational culture aspects like Management's Duty of care, allocation of resources for HSE characteristics, timely reporting and investigation of incidents, setting HSE prerequisites criteria for selection of subcontractors, prioritization of safety above all other factors and need for establishing proper work method statements and risk assessments.
- xi. Above all, enforcement actions and regular inspections by government authorities on the implementation of HSE system at workplaces and upholding of Health and Environmental policies and best practices together with creating a rule of disciplined safety and training system are recommended through this research.

The hypothesis for this research is tested true where multiple challenges were identified; the main reasons being, the human capital and lack of adequate enforcement by local authorities. Further the research identified various contributory factors also which are interlinked with the Management Culture, Human Capital and Work Culture. In construction industry, health and safety risk tolerances are influenced by many factors, some are Management culture and work culture whereas some are Human Capital or personal subjective perceptions and these

factors are interrelated with each other. Among all, implementing a rigorous safety management system is most important while attention should be paid to personal subjective perception (Wang et.al., 2016).

7.3 Limitations of the research

The conducted research work through literature review and summary of findings through questionnaires had led to conclude on certain major and contributory factors in construction industry that pose potential challenges in Qatar's health and safety implementation at work places and management. The available data to support the research was limited since questionnaires and subsequent interviews limited to few sites which are not much commensuration to the entire construction industry which is very vast pertaining to Qatar's current construction boom. A need for increasing more questions in the questionnaire and conduct of site discussions and interviews with all levels of employees in various languages would have provided more light to the research. The advantage of author's proficiency in knowledge of various languages spoken by the Asian Country employees could not be conveniently utilized but limited to managerial and supervisory workforce or else linguistic barriers and other communication gaps could have been investigated in more detail. The overall findings suggest that Qatar's construction projects with good H&S performance record has been maintaining a positive H&S culture; whereas it has never been consistent but subject to continually being created or recreated due to dynamicity in construction. This means that humans might change, locations of work place might change and technology might change which can cause the survey results to endure a real time test. Consequently it is strongly recommended to reflect on the wider flank of these characteristics because projects involving multi-cultural operatives could complicate and impede to the real findings. However a modest contribution to knowledge has been provided and there are scopes for future research in the future to develop certain characteristics done through this work for further dimensions in the field. For future researches the operations of HSE in other Gulf Cooperation Council countries and developed nations with similar problems and challenges need to be investigated and included to explore the transportability of knowledge of HSE in construction industry.

-----END-----

References

1. Accenture 2016; Seven Trends Transforming the Construction Marketplace
<https://www.accenture.com/us-en/insight-achieving-high-performance-construction-industry>
2. Adam Neave, 2014 Adam A Neave. SH&E Challenges in the Gulf. AdamA. Neave, BASc (OSH), CRSP, CHSC, is an instructor in the OHS program at the College of the North Atlantic-Qatar in Doha, Qatar.
3. Adhikary, P., Keen, S. and Van Teijlingen, E., 2011. Health Issues among Nepalese migrant workers in the Middle East. *Health Science Journal*, 5(3), pp.169-175.
4. AGC 2016 The Challenges Facing A Growing Industry: The 2016 Construction Hiring And Business Outlook – Associated General Contractors Of America
5. Al-Tabtabai, H.M., 2002. Analyzing construction site accidents in Kuwait. *Kuwait J. Sci. Eng*, 29(2), pp.213-238.
6. Ali, H.A.E.M., Al-Sulaihi, I.A. and Al-Gahtani, K.S., 2013. Indicators for measuring performance of building construction companies in Kingdom of Saudi Arabia. *Journal of King Saud University-Engineering Sciences*, 25(2), pp.125-134.
7. Algozzine, B. and Hancock, D., 2016. Doing case study research: A practical guide for beginning researchers. Teachers College Press.
8. Al-Abbadi, I., Senouci, A. and Eldin, N., 2015 Safety improvement on building construction sites in Qatar.
9. Allison, B., Anne, H., O'Sullivan, T., Owen, A., Hilton, A. and Rothwell, A., 2016. Research skills for students. Routledge.
10. Al-Thani, H., Peralta, R., El-Menyar, A., Mekkodathil, A., Consunji, R., Allen, K., Hyder, A. (2015). Epidemiology of occupational injuries by nationality in Qatar: Evidence for focused occupational safety programmes, *Injury*, Vol. 46, No. 9, pp. 1806-1813
11. Alvesson, M. and Sandberg, J., 2011. Generating research questions through problematization. *Academy of management review*, 36(2), pp.247-271.
12. Amnesty International, 2013. Qatar: The dark side of migration: Spotlight on Qatar's construction sector ahead of the World Cup. [pdf],

13. Andaleeb, S.S. and Hasan, K., 2016. Marketing Research. In Strategic Marketing Management in Asia: Case Studies and Lessons across Industries (pp. 111-160). Emerald Group Publishing Limited.
14. Azari-Rad, H., 2015. Subcontracting and injury rates in construction. Members-only Library.
15. Bas, E., 2014. An integrated quality function deployment and capital budgeting methodology for occupational safety and health as a systems thinking approach: The case of the construction industry. Accident Analysis & Prevention, 68, pp.42-56.
16. Beaumont, P., 2013. Water resources and their management in the Middle East. Change and Development in the Middle East (Routledge Revivals): Essays in Honour of WB Fisher, p.40.
17. Bell, J., 2010. Doing your Research Project: A guide for first-time researchers in education, health and social sciences. Fifth Edition, Open University Press
18. Biggam, J., 2015. Succeeding with your master's dissertation: a step-by-step handbook. McGraw-Hill Education (UK) Third edition, ISBN-13:978-0-335-26448-3 pp 147-218 .
19. Biggs, S.E., Banks, T.D., Davey, J.D., Freeman, J.E., 2013. Safety leaders' perceptions of safety culture in a large Australasian construction organisation. Safety Science 52, pp 3-12
20. Bust, P.D., Gibb, A.G. and Pink, S., 2008. Managing construction health and safety: Migrant workers and communicating safety messages. Safety Science, 46(4), pp.585-602.
21. Estabrooks, C.A., Cummings, G.G., Olivo, S.A., Squires, J.E., Giblin, C. and Simpson, N., 2009. Effects of shift length on quality of patient care and health provider outcomes: systematic review. Quality and Safety in Health Care, 18(3), pp.181-188.
22. Charehzehi, A. and Ahankoob, A., 2012. Enhancement of safety performance at construction site. International Journal of Advances in Engineering & Technology, ISSN, pp.2231-1963.
23. . Why operatives engage in unsafe work behaviour: Investigation factors on construction sites. Safety Science 46, pp 566-584
24. Cohn, J.B. and WARDLAW, M.I., 2016. Financing Constraints and Workplace Safety. The Journal of Finance.

25. Cooper, R., Mukherjee, N., Al-Khady, A.D. and Garlapati, A., 2015, January. Communicating with Multinational Workforce on SH&E Issues: An International Perspective & Best Practices. In ASSE Professional Development Conference and Exposition. American Society of Safety Engineers.
26. Csikszentmihalyi, M., 2014. Attention and the holistic approach to behavior. In Flow and the Foundations of Positive Psychology (pp. 1-20). Springer Netherlands.
27. De Longueville, F., Hountondji, Y.C., Henry, S. and Ozer, P., 2010. What do we know about effects of desert dust on air quality and human health in West Africa compared to other regions?. Science of the Total Environment, 409(1), pp.1-8.
28. Department for Environment, Food & Rural Affairs, UK Government 2012, Measuring and reporting environmental impacts: guidance for businesses. <http://www.defra.gov.uk/environment/economy/business-efficiency/reporting>
29. Derkx, B.H., 2004. A comparison of Likert scale and visual analogue scales as response options in children's questionnaires. Acta paediatrica, 93(6), pp.830-835.
30. D.P. Fang, X.Y. Huang, J. Hinze, 2004; Benchmarking studies on construction safety management in China Journal of Construction Engineering and Management, 130 (3) (2004), pp. 424–432
31. Erik Eriksson, P., 2010. Improving construction supply chain collaboration and performance: a lean construction pilot project. Supply Chain Management: An International Journal, 15(5), pp.394-403
32. Fass, S., Yousef, R., Liginlal, D. and Vyas, P., 2016. Understanding causes of fall and struck-by incidents: what differentiates construction safety in the Arabian Gulf region?. Applied ergonomics.
33. Fang and Wu , 2013 Development of a Safety Culture Interaction (SCI) model for construction projects. Safety Science 57, pp138-149
34. Glendon, A.I. and Stanton, N.A., 2000. Perspectives on safety culture. Safety Science, 34(1), pp.193-214.
35. Feng, Y., Teo, E.A.L., Ling, F.Y.Y. and Low, S.P., 2014. Exploring the interactive effects of safety investments, safety culture and project hazard on safety performance: An empirical analysis. International Journal of Project Management, 32(6), pp.932-943.

36. Gardner, A., Pessoa, S., Diop, A., Al-Ghanim, K., Le Trung, K. and Harkness, L., 2013. A portrait of low-income migrants in contemporary Qatar. *Journal of Arabian Studies*, 3(1), pp.1-17.
37. Ghazi, A.N., Petersen, K., Reddy, S.S.V.R. and Nekkanti, H., 2017. Survey research in software engineering: problems and strategies. *arXiv preprint arXiv:1704.01090*.
38. Goh, C.S. and Abdul-Rahman, H., 2013. The identification and management of major risks in the Malaysian construction industry. *Journal of Construction in Developing Countries*, 18(1), pp.19-32.
39. Global construction Project owner's survey KPMG International 2015 Slater, A., 2008. KPMG International survey of corporate responsibility reporting 2015. KPMG Global Sustainability Services, The Netherlands.
40. Goh, Y.M., Brown, H. and Spickett, J., 2010. Applying systems thinking concepts in the analysis of major incidents and safety culture. *Safety Science*, 48(3), pp.302-309.
41. Goldenhar, L., Williams, L.J. and G. Swanson, N., 2003. Modelling relationships between job stressors and injury and near-miss outcomes for construction labourers. *Work & Stress*, 17(3), pp.218-240.
42. Hafeez, M.A., Ahmad, A.M., Chahrour, R., Vukovic, V., Dawood, N. and Kassem, M., 2016. Principles and recommendations for client information requirements for BIM enabled construction projects in Qatar. *International Journal of Product Lifecycle Management*, 9(3), pp.198-218.
43. Han, S., Saba, F., Lee, S., Mohamed, Y. and Peña-Mora, F., 2014. Toward an understanding of the impact of production pressure on safety performance in construction operations. *Accident Analysis & Prevention*, 68, pp.106-116.
44. Haslam, R.A., Hide, S.A., Gibb, A.G., Gyi, D.E., Pavitt, T., Atkinson, S. and Duff, A.R., 2005. Contributing factors in construction accidents. *Applied ergonomics*, 36(4), pp.401-415.
45. Hochberg, Y.V. and Rauh, J.D., 2012. Local overweighting and underperformance: evidence from limited partner private equity investments. *Review of Financial Studies*, p.hhs128.
46. Health and Safety Executive. Work-related injuries and ill health in construction: Injuries, 2003. <http://www.hse.gov.uk/statistics/industry/construction/injuries.htm>.
47. Health and Safety Executive, HSE, 2013b. Health and Safety Executive Annual Statistics Report for Great Britain. Health and Safety Executive.

48. Health and Safety Executive, HSE, 2014. Health and safety in construction in Great Britain, 2014. Health and Safety Executive. Available from <http://www.hse.gov.uk/Statistics/industry/construction/index.htm>
49. Hinze, J., Thurman, S., Wehle, A., 2013. Leading indicators of construction performance. *Safety Science* 51, pp23-28
50. Huang, Y.H., Chen, P.Y., Krauss, A.D. and Rogers, D.A., 2004. Quality of the execution of corporate safety policies and employee safety outcomes: Assessing the moderating role of supervisor safety support and the mediating role of employee safety control. *Journal of Business and Psychology*, 18(4), pp.483-506.
51. Human Rights Watch, 2012. Building a Better World Cup - Protecting Migrant Workers in Qatar Ahead of FIFA 2022. [pdf], https://www.hrw.org/sites/default/files/reports/qatar0612webwcover_0.pdf
52. International Labour Organisation, 2009. World day for safety and health at work 2009: Facts on safety and health at work, ILO, Geneva.
53. International Labor Organization, 2008. Beyond deaths and injuries: The ILO's role in promoting safe and healthy jobs. [pdf],
54. International Trade Union Confederation, 2014. The Case Against Qatar [pdf], http://www.itucsi.org/IMG/pdf/the_case_against_qatar_en_web170314.pdf
55. Isaac, S. and Edrei, T., 2016. A statistical model for dynamic safety risk control on construction sites. *Automation in Construction*, 63, pp.66-78.
56. Jarkas, A.M., Kadri, C.Y. and Younes, J.H., 2012. A survey of factors influencing the productivity of construction operatives in the state of Qatar. *International Journal of Construction Management*, 12(3), pp.1-23.
57. Jones, S., 2014. Business in Emerging Markets and Human Rights-the example of worker safety in the construction sector, especially since the recovery from the world-wide economic crisis (No. 2014/37).
58. Kaskutas, V., Dale, A.M., Lipscomb, H. and Evanoff, B., 2013. Fall prevention and safety communication training for foremen: Report of a pilot project designed to improve residential construction safety. *Journal of safety research*, 44, pp.111-118.
59. Levitt, N.M. Samelson. 1987; *Construction safety management*; McGraw-Hill Book Company, New York

60. Laerhoven, H.V., Zaag-Loonen, H.V.D. and Derkx, B.H., 2004. A comparison of Likert scale and visual analogue scales as response options in children's questionnaires. *Acta paediatrica*, 93(6), pp.830-835.
61. Larsson, P., Dekker, S.W. and Tingvall, C., 2010. The need for a systems theory approach to road safety. *Safety science*, 48(9), pp.1167-1174.
62. Leveson, N.G., 2011. Applying systems thinking to analyze and learn from events. *Safety Science*, 49(1), pp.55-64.
63. Long, Stephen. 1999. "Subcontracting at Heart of Substandard Occupational Health & Safety." *Australian Financial Review*, November 10, p. 21.
64. Lopez, J.C., Lafargue, P., Gaafar, A., Al-Sheibani, H.S. and Kurinsky, J., 2008, January. Integrated Implementation of a Management System in Qatar: An Innovative Approach Towards a Sustainable Performance Excellence. In *SPE International Conference on Health, Safety, and Environment in Oil and Gas Exploration and Production*. Society of Petroleum Engineers.
65. Loosemore, M. and Andonakis, N., 2007. Barriers to implementing OHS reforms—The experiences of small subcontractors in the Australian Construction Industry. *International Journal of Project Management*, 25(6), pp.579-588.
66. Lutz Allen, S., Smith, J.E. and Da Silva, N., 2013. Leadership style in relation to organizational change and organizational creativity: Perceptions from nonprofit organizational members. *Nonprofit Management and Leadership*, 24(1), pp.23-42.
67. Markham, A., 2004. Representation in online ethnographies: a matter of context sensitivity. 2004). *Online Social Research: Methods, Issues, and Ethics*, Peter Lang, New York, pp.141-155.
68. MDPS 2014- Ministry of Development planning and statistics, 2014 Authority, Q.S., 2014. Population Structure. January, 31.
69. Melia, J.L., Mearns, K., Silva, S.S., Lima, M.L. (2008) Safety climate responses and the perceived risk of accidents in the construction industry. *Safety Science* 46, pp 949-958
70. Mills, G.E., Gay, L.R. and Airasian, P.W., 2006. Educational research.
71. Ministry of Labour statistics, 2013 Qatar Statistics Authority. Labor force sample survey, 2013, http://www.qsa.gov.qa/eng/surveys/labour_survey_jul_2013.xls.
72. Mitropoulos, P. and Cupido, G., 2009. Safety as an emergent property: investigation into the work practices of high-reliability framing crews. *Journal of Construction Engineering and Management*, 135(5), pp.407-415.

73. Mohammad, R. and Sidaway, J.D., 2016. Shards and Stages: Migrant Lives, Power, and Space Viewed from Doha, Qatar. *Annals of the American Association of Geographers*, 106(6), pp.1397-1417.
74. Mounif Killani, 2014. Building and Construction Sector in Qatar : Economic and Commercial Counsellor, Kuwait.
75. Murray Reid, J., Hassan, K.E., Sirin, O. and Taha, R.A., Demonstrating the Worth of Recycled Aggregates—A Case Study from Qatar. In *Geo-Chicago 2016* (pp. 534-545).
76. O'Connor, P., Buttrey, S.E., O'Dea, A., Kennedy, Q., 2011. Identifying and addressing the limitations of safety climate surveys. *Journal of Safety Research* 42, pp 259-265
77. Opdenakker, R., 2006, September. Advantages and disadvantages of four interview techniques in qualitative research. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 7, No. 4).
78. Park, M. and Pena-Mora, F., 2003. Dynamic change management for construction: introducing the change cycle into model-based project management. *System Dynamics Review*, 19(3), p.213.
79. Piper, D.L.A., 2014. Migrant labour in the construction sector in the state of Qatar. Independent review commissioned by the Government of Qatar. Doha: Author.
80. Pipitsupaphol, T. and Watanabe, T., 2000, September. Identification of root causes of labor accidents in the Thai construction industry. In *Proceedings of the 4th Asia Pacific Structural Engineering and Construction Conference (APSEC 2000)* (pp. 13-15).
81. Qatar Construction Specifications-QCS 2014, Section 01 Part 10 Occupational Health and Safety; State of Qatar
82. Qatar News Agency, 2015. Qatar's Government Communication Office Denies Washington Post Article about Worker Conditions in Qatar, Available at: <http://www.qna.org.qa/en-us/News/15060218340056/Qatars-GovernmentCommunication-Office-Denies-Washington-Post-Article-about-WorkerConditions-in-Qatar>
83. Rasmussen, H.B. and Tharaldsen, J., 2012. The impact of safety climate on risk perception on Norwegian and Danish production platforms. *Advances in Safety, Reliability and Risk Management: ESREL 2011*, 293.

84. Pintelon, L. and Muchiri, P.N., 2009. Safety and maintenance. In Handbook of Maintenance Management and Engineering (pp. 613-648). Springer London.
85. Reese, C.D. and Eidson, J.V., 2006. Handbook of OSHA construction safety and health. CRC Press.
86. Sadiq, A. and Howari, F., 2009. Remote sensing and spectral characteristics of desert sand from Qatar Peninsula, Arabian/Persian Gulf. Remote Sensing, 1(4), pp.915-933.
87. SangUk Hana, Farzaneh Saba b, SangHyun Leec,*, Yasser Mohamedb, Feniosky Pena-Mora ~ c,d Accident Analysis and Prevention 68 (2014). Toward an understanding of the impact of production pressure on safety performance in construction operations pp106–116
88. Senouci, A., Al-Abbadi, I. and Eldin, N., 2015. Safety improvement on building construction sites in Qatar. Procedia Engineering, 123, pp.504-509.
89. Shibani, A., Saidani, M. and Alhajeri, M., 2013. Health and safety influence on the construction project performance in United Arab Emirates (UAE). Journal of Civil Engineering and Construction Technology, 4(2), pp.32-44.
90. Sugimoto, T., 2010, January. IIF (Incident and Injury Free) Implementation in The Workplace. In SPE International Conference on Health, Safety and Environment in Oil and Gas Exploration and Production. Society of Petroleum Engineers.
91. Sultan, Z., 2013. High-rise and high risk: Spotlight on Qatar's safety standards. <<http://www.nature.com/middleeast/2013/13028/full/nmiddleeast.2013.62.html>>.
92. Torrance, J.V.B., 2004. Globalisation and trends in the international construction industry: a Malaysian perspective. Globalisation and Construction, p.81.
93. Törner, M. and Pousette, A., 2009. Safety in construction—a comprehensive description of the characteristics of high safety standards in construction work, from the combined perspective of supervisors and experienced workers. Journal of Safety Research, 40(6), pp.399-409.
94. Tserng, H.P., Ho, S.P. and Jan, S.H., 2014. Developing BIM-assisted as-built schedule management system for general contractors. Journal of Civil Engineering and Management, 20(1), pp.47-58.
95. Tuma, M.A., Acerra, J.R., El-Menyar, A., Al-Thani, H., Al-Hassani, A., Recicar, J.F., Al Yazeedi, W. and Maull, K.I., 2013. Epidemiology of workplace-related fall from height and cost of trauma care in Qatar. International journal of critical illness and injury science, 3(1), p.3.

96. United Nations, 2014. Report of the Special Rapporteur on the human rights of migrants, [pdf], http://www.ohchr.org/Documents/Issues/SRMigrants/A-HRC-26-35-Add1_en.pdf
97. Wang, J., Zou, P.X. and Li, P.P., 2016. Critical factors and paths influencing construction workers' safety risk tolerances. *Accident Analysis & Prevention*, 93, pp.267-279.
98. Wells J, 2014; Improving employment standards in construction in Qatar <http://www.engineersagainstopoverty.org/documentdownload.ax?documentresourceid=2>
99. Wells, J. and Hawkins, J., 2014. Promoting Construction Health and Safety through Procurement: A briefing note for developing countries.
100. Wengraf, T., 2001. Qualitative research interviewing: Biographic narrative and semi-structured methods. Sage.
101. Wu, Z., Ann, T.W., Shen, L. and Liu, G., 2014. Quantifying construction and demolition waste: an analytical review. *Waste Management*, 34(9), pp.1683-1692.
102. Yung, P., 2009. Institutional arrangements and construction safety in China: an empirical examination. *Construction Management and Economics*, 27(5), pp.439-450.
103. Zhang⁶⁰, P., Lingard, H., Blismas, N., Wakefield, R. and Kleiner⁶¹, B., 2014. Analysis of difference/similarity between construction project participants' work health and safety (WHS) risk perceptions. *Achieving sustainable construction health and safety*.
104. Zhang, S., Teizer, J., Lee, J.K., Eastman, C.M. and Venugopal, M., 2013. Building information modeling (BIM) and safety: Automatic safety checking of construction models and schedules. *Automation in Construction*, 29, pp.183-195

Nizam Meerasahib

From: Nizam Meerasahib <F1100557@hdec.co.kr>
Sent: Saturday, May 27, 2017 4:26 PM
To: SHANAVAS FAKKRUDHEEN(SHANAVAS FAKKRUDHEEN) <F0900721@hdec.co.kr>
(F0900721@hdec.co.kr)
Subject: QUESTIONNAIRE FOR RESEARCH WORK
Attachments: QUESTIONNAIRE FOR RESEARCH WORK.xlsx

Dear Sir/Madam,

1. I am an MSc student of the University of Greenwich, UK . As a part of my study program, I am carrying out a research on the topic **"CHALLENGES TO HSE IN QATARs CONSTRUCTION INDUSTRY"**. This mail is to invite you to participate in this research by completing the attached Questionnaire. Completion of the questionnaire will take approximately 8~15 minutes.
2. Please note that completion of the questionnaire will involve answering questions by ticking / marking on one of the three answers (Yes, No, Not Aware) against each question in the provisioned space. Your answers will be treated with due confidentiality and once the data is entered into the spreadsheet, it will be deleted from the system. Please be assured that the same will not be forwarded / disseminated to other researchers or other agencies. My research supervisor Mr. Kostis Evangelinos and I will be the only two persons who will access this data and only for the purpose of this research work.
3. It will be quite useful if you could return the completed questionnaire within 10 days for my further data analysis and subsequent submission. Many thanks in advance for your valuable time to participate in this survey and for completing the questionnaire with your experience and knowledge in the industry.

With warm regards,

NIZAM MEERASAHIB

Health and Safety Manager,
Hyundai Engg & Construction,
Doha, State of Qatar.
Tele : +974-3325 5096, 5515 6154

CONFIDENTIAL

QUESTIONNAIRE FOR RESEARCH SURVEY				
Tick your current position (Director/Manager/ HSE staff/ Engineer/ Admin/Finance/ Supervisor)				
#	DESCRIPTION	YES	NO	N/A
1	Is your company MANAGEMENT COMMITTED to Health & Safety (H&S) of all employees and do they have DUTY OF CARE ?			
2	Does your company have H&S POLICIES AND PROCUDURES and is it renewed periodically?			
3	For hiring subcontractors/suppliers, is their HSE PERFORMANCE/PROFILE considered to QUALIFY approval ?			
4	Is RISK ASSESSMENT and WORK METHOD STATEMENTS prepared for critical and other activities prior to work?			
5	If there is PRESSURE to MEET DEADLINES , is H&S prioritized than production by RISK MANAGEMENT ?			
6	Are accidents and incidents INVESTIGATED in your workplace properly and REPORTED ?			
7	Does your management discuss H&S issues in CONSTRUCTION MEETINGS and conduct SAFETY TOURS ?			
8	Are adequate RESOURCES allocated for HSE in your company?			
9	Does your company consider H&S KNOWLEDGE / SKILLS at the time of RECRUITMENT of construction employees?			
10	Do you think construction SUPERVISORS should be COMPETENT enough to perform tasks safely?			
11	Do Managers require to attend HSE TRAININGS and need they be aware of health and safety at workplace?			
12	For employees' APPRAISAL & PROMOTIONS , is HSE PERFORMANCE VALUED by the management?			
13	Do you consider WORKERS WELFARE STANDARDS with importance and inspect their living conditions?			
14	Are HSE AUDITS and INSPECTIONS conducted regularly at workplace by competent staff and the observations rectified ?			
15	Do your company take adequate mesaures at work places and off site for prevention of HEAT STRESS in SUMMER ?			
16	Do you consider LANGUAGE FACTORS for communication between workers&supervisors for understanding of HSE aspects?			
17	Do your company conduct SAFETY MOTIVATIONAL CAMPAIGNS AND INCENTIVE SCHEMES for employees?			
18	Does the company comply with the LEGAL HSE REGULATIONS , safety polices and procedures properly?			
19	Does your workplace consider ENVIRONMENTAL LAWS, WASTE MANAGEMENT AND HEALTH policies?			
20	Do the SAFETY VIOLATIONS in the work place treated with PROPER DISCIPLINARY ACTIONS & retrained in H&S?			
Y- YES, N- NO, N/A - NOT AWARE				

INTERVIEW QUESTIONS
(As applicable to the interviewee's position)

1. Question: What are the critical activities currently ongoing in your site?
2. Question: Did you undergo any HSE external trainings / courses in your career?
3. Question: Is there is a system in the company to check the welfare conditions of the employees (accommodation, transportation, food and site rest facilities)?
4. Question: Are you involved with health and safety decisions/matters and in what capacity?
5. Question: Why do you need a HSE policy and what happens next after the policy is signed?
6. Question: Do you check the HSE pre-qualification of a subcontractor during selection procedure?
7. Question: Do you analyze the accident records and KPI's of the work site?
8. Question: Do you have HSE motivational / incentive schemes in your company?
9. Question: Do you think that identifying the critical factors that influence the success of accidents reporting system is crucial?
10. Question: During annual appraisal, is there any consideration for employee's safety performance during the year?
11. Question: What are the major challenges to HSE in Construction Industry in Qatar?
12. Question: What are the precautions adopted against prevention of heat stress at workplaces?
13. Question: How many employees have undergone health surveillance and as per their trades?
14. Question: Have any local government inspectors visited workplace for HSE inspections?
15. Question : What are the waste management, segregation and disposal arrangements in your organisation?

----END---

COMPANY WISE FINAL RESULTS OF ALL RESPONSES - SUMMARY																																										
#	SECTION	DESCRIPTION	SS-27		UCC-21		CaQ-22		HLG-9		HBO-22		BEM-17		QDVC-12		RCA-20		HDEC-47		ABET-12																					
			YES	NO	%	YES	NO	%	YES	NO	%	YES	NO	%	YES	NO	%	YES	NO	%	YES	NO	%	YES	NO	%																
1	MANAGEMENT CULTURE	MANAGEMENT COMMITMENT / DUTY OF CARE	15	60.00	10	40.00	11	57.9	8	42.11	13	61.90	8	38.1	5	62.50	3	37.5	14	66.67	7	33.33	12	75.00	4	25.00	8	72.73	3	27.27	14	73.7	5	26.32	35	76.1	11	23.91	6	54.5	5	45.45
2		HSE POLICIES / PROCEDURES	15	60.00	10	40.00	11	57.9	8	42.11	13	61.90	8	38.1	5	62.50	3	37.5	14	66.67	7	33.33	12	75.00	4	25.00	8	72.73	3	27.27	14	73.7	5	26.32	34	75.6	11	24.44	6	54.5	5	45.45
3		SUBCON HSE STANDARDS	16	61.54	10	38.46	11	57.9	8	42.11	13	61.90	8	38.1	6	66.67	3	33.3	14	66.67	7	33.33	12	75.00	4	25.00	8	72.73	3	27.27	14	73.7	5	26.32	35	76.1	11	23.91	7	58.3	5	41.67
4	MANAGEMENT	METHOD STATEMENT & RISK ASSESSMENT	15	60.00	10	40.00	11	57.9	8	42.11	13	61.90	8	38.1	5	62.50	3	37.5	14	66.67	7	33.33	12	75.00	4	25.00	8	72.73	3	27.27	14	73.7	5	26.32	33	75.0	11	25.00	6	54.5	5	45.45
5		RISK MANAGEMENT & PRIORITISATION	15	60.00	10	40.00	10	58.8	7	41.18	12	60.00	8	40.0	5	62.50	3	37.5	14	66.67	7	33.33	12	75.00	4	25.00	8	72.73	3	27.27	12	70.6	5	29.41	26	68.4	12	31.58	6	54.5	5	45.45
6		ACCIDENT INVESTIGATION	15	60.00	10	40.00	11	57.9	8	42.11	13	61.90	8	38.1	5	62.50	3	37.5	12	54.55	10	45.45	12	75.00	4	25.00	8	72.73	3	27.27	14	73.7	5	26.32	36	76.6	11	23.40	6	54.5	5	45.45
7	MANAGEMENT	MANAGEMENT HSE MEETINGS AND TOURS	13	56.52	10	43.48	11	57.9	8	42.11	13	61.90	8	38.1	5	62.50	3	37.5	11	61.11	7	38.89	12	75.00	4	25.00	8	72.73	3	27.27	14	73.7	5	26.32	30	73.2	11	26.83	6	54.5	5	45.45
8		ALLOCATION OF RESOURCES FOR HSE	15	60.00	10	40.00	11	57.9	8	42.11	13	61.90	8	38.1	5	62.50	3	37.5	14	66.67	7	33.33	12	75.00	4	25.00	8	72.73	3	27.27	14	73.7	5	26.32	35	76.1	11	23.91	6	54.5	5	45.45
		TOTAL	119	59.76	80	40.24	87	58.0	63	41.99	111	61.67	64	38.3	41	63.02	24	37.0	107	64.46	59	35.54	96	75.00	32	25.00	64	72.7	24	27.27	110	73.3	40	26.70	264	74.6	89	25.37	49	55.0	40	44.98
1	HUMAN CAPITAL	HSE KNOWLEDGE / SKILLS - RECRUITMENT	8	30.77	18	69.23	7	36.8	12	63.16	8	38.10	13	61.9	3	37.50	5	62.5	6	28.57	15	71.43	4	25.00	12	75.00	4	36.4	7	63.64	6	31.6	13	68.42	18	39.1	28	60.87	5	45.5	6	54.55
2		COMPETENT WORK SUPERVISION	8	30.77	18	69.23	7	36.8	12	63.16	8	38.10	13	61.9	3	37.50	5	62.5	6	28.57	15	71.43	4	25.00	12	75.00	4	36.4	7	63.64	6	31.6	13	68.42	18	43.9	23	56.10	4	40.0	6	60.00
3		HSE TRAINING FOR MANAGEMENT	8	30.77	18	69.23	7	36.8	12	63.16	8	38.10	13	61.9	3	37.50	5	62.5	6	28.57	15	71.43	4	28.57	10	71.43	4	36.4	7	63.64	6	31.6	13	68.42	18	39.1	28	60.87	5	45.5	6	54.55
4		HSE PERFORMANCE AND APPRAISAL	8	33.33	16	66.67	7	36.8	12	63.16	8	38.10	13	61.9	3	37.50	5	62.5	6	28.57	15	71.43	4	25.00	12	75.00	2	25.0	6	75.00	6	31.6	13	68.42	19	46.3	22	53.66	5	45.5	6	54.55
5		WORKERS WELFARE STANDARDS	8	30.77	18	69.23	7	36.8	12	63.16	8	38.10	13	61.9	3	37.50	5	62.5	6	28.57	15	71.43	4	25.00	12	75.00	4	36.4	7	63.64	6	31.6	13	68.42	17	37.8	28	62.22	5	45.5	6	54.55
6		AUDITS AND INSPECTIONS	7	31.82	15	68.18	7	36.8	12	63.16	7	36.84	12	63.2	3	37.50	5	62.5	6	28.57	15	71.43	4	25.00	12	75.00	4	36.4	7	63.64	6	31.6	13	68.42	15	37.5	25	62.50	4	44.4	5	55.56
7	HUMAN CAPITAL	HEAT STRESS PREVENTION	8	30.77	18	69.23	7	36.8	12	63.16	8	38.10	13	61.9	3	37.50	5	62.5	6	28.57	15	71.43	4	25.00	12	75.00	3	33.3	6	66.67	6	31.6	13	68.42	17	38.6	27	61.36	5	45.5	6	54.55
8		LANGUAGE BARRIERS & COMMUNICATION	8	30.77	18	69.23	7	35.0	13	65.00	8	38.10	13	61.9	3	37.50	5	62.5	6	28.57	15	71.43	4	25.00	12	75.00	4	36.4	7	63.64	7	35.0	13	65.00	18	40.0	27	60.00	5	45.5	6	54.55
9		MOTIVATION FOR SAFETY	8	30.77	18	69.23	7	36.8	12	63.16	8	38.10	13	61.9	3	37.50	5	62.5	6	28.57	15	71.43	4	25.00	12	75.00	4	40.0	6	60.00	6	31.6	13	68.42	15	38.5	24	61.54	5	45.5	6	54.55
		TOTAL	71	31.17	157	68.83	63	36.6	109	63.36	71	37.96	116	62.0	27	37.50	45	62.5	54	28.57	135	71.43	36	25.40	106	74.60	33	35.2	60	64.83	55	32.0	117	68.04	155	40.1	232	59.90	43	44.7	53	55.26
1	WORK CULTURE	COMPLIANCE TO SAFETY POLICIES	16	61.54	10	38.46	11	57.9	8	42.11	13	61.90	8	38.1	6	66.67	3	33.3	14	66.67	7	33.33	12	75.00	4	25.00	8	72.73	3	27.27	15	75.0	5	25.00	35	76.1	11	23.91	7	58.3	5	41.67
2		ENVIRONMENTAL AND SUSTAINABILITY	16	61.54	10	38.46	11	57.9	8	42.11	13	61.90	8	38.1	6	66.67	3	33.3	14	66.67	7	33.33	12	75.00	4	25.00	8	72.73	3	27.27	15	75.0	5	25.00	36	81.8	8	18.18	6	60.0	4	40.00
3		DISCIPLINARY ACTIONS FOR VIOLATIONS	16	76.19	5	23.81	9	60.0	6	40.00	13	65.00	7	35.0	6	66.67	3	33.3	14	66.67	7	33.33	12	75.00	4	25.00	8	72.73	3	27.27	15	75.0	5	25.00	24	75.0	8	25.00	7	58.3	5	41.67
		TOTAL	48	66.42	25	33.58	31	58.6	22	41.40	39	62.94	23	37.1	13	66.67	9	33.3	42	66.67	21	33.33	36	75.00	12	25.00	24	72.7	9	27.27	45	75.0	15	25.00	95	77.6	27	22.36	20	58.9	14	41.11

POSITION WISE FINAL RESULTS OF ALL RESPONSES - SUMMARY																													
#	SECTION	DIRECTORS-8			MANAGERS-24			ENGINEER-43			HSE STAFF-39			SUPERVISORS-79			ADMINISTRATION-8			FINANCE-8									
		YES	NO	%	YES	NO	%	YES	NO	%	YES	NO	%	YES	NO	%	YES	NO	%	YES	NO	%							
1	MANAGEMENT CULTURE	5	62.50	3	37.50	17	77.27	5	22.73	15	38.46	24	61.54	32	82.05	7	17.95	42	57.53	31	42.47	3	37.50	5	62.50	4	50.00	4	50.00
2		2	28.57	5	71.43	10	45.45	12	54.55	22	51.16	21	48.84	12	31.58	27	68.42	40	57.97	29	42.03	3	37.50	5	62.50	2	25.00	6	75.00
3		4	50.00	4	50.00	8	33.33	16	66.67	26	63.41	15	36.59	22	56.41	17	43.59	42	58.33	30	41.67	3	37.50	5	62.50	3	37.50	5	62.50
4		3	37.50	5	62.50	13	65.00	7	35.00	22	62.86	13	37.14	26	66.67	13	33.33	42	54.55	35	45.45	3	37.50	5	62.50	3	37.50	5	62.50
5		4	57.14	3	42.86	8	38.10	13	61.90	14	36.84	24	63.16	19	52.78	17	47.22	40	58.82	28	41.18	2	33.33	4	66.67	2	25.00	6	75.00
6		3	60.00	2	40.00	10	41.67	14	58.33	20	46.51	23	53.49	19	51.35	18	48.65	38	51.35	36	48.65	4	50.00	4	50.00	3	37.50	5	62.50
7		6	75.00	2	25.00	19	79.17	5	20.83	22	59.46	15	40.54	17	51.52	16	48.48	35	50.72	34	49.28	3	37.50	5	62.50	5	62.50	3	37.50
8		3	37.50	5	62.50	10	41.67	14	58.33	20	46.51	23	53.49	20	51.28	19	48.72	21	31.34	46	68.66	3	37.50	5	62.50	4	50.00	4	50.00
		30	51.03	29	48.97	95	52.71	86	47.29	161	50.65	158	49.35	167	55.45	134	44.55	300	52.58	269	47.42	24	38.54	38	61.46	26	40.63	38	59.38
		TOTAL																											
1	HUMAN CAPITAL	2	28.57	5	71.43	10	45.45	12	54.55	18	41.86	25	58.14	16	43.24	21	56.76	17	23.29	56	76.71	4	50.00	4	50.00	3	37.50	5	62.50
2		3	50.00	3	50.00	9	42.86	12	57.14	20	50.00	20	50.00	18	51.43	17	48.57	26	34.21	50	65.79	3	37.50	5	62.50	3	50.00	3	50.00
3		2	28.57	5	71.43	4	21.05	15	78.95	22	51.16	21	48.84	12	30.77	27	69.23	19	27.94	49	72.06	3	37.50	5	62.50	2	25.00	6	75.00
4		4	50.00	4	50.00	11	45.83	13	54.17	12	44.44	15	55.56	16	41.03	23	58.97	23	31.08	51	68.92	5	62.50	3	37.50	3	37.50	5	62.50
5		3	37.50	5	62.50	10	41.67	14	58.33	20	46.51	23	53.49	20	51.28	19	48.72	21	31.34	46	68.66	3	37.50	5	62.50	4	50.00	4	50.00
6		4	57.14	3	42.86	8	38.10	13	61.90	14	36.84	24	63.16	19	52.78	17	47.22	28	41.18	40	58.82	2	33.33	4	66.67	2	25.00	6	75.00
7		3	37.50	5	62.50	9	37.50	15	62.50	15	34.88	28	65.12	18	50.00	18	50.00	27	40.30	40	59.70	3	37.50	5	62.50	2	25.00	6	75.00
8		4	50.00	4	50.00	10	41.67	14	58.33	12	30.77	27	69.23	18	46.15	21	53.85	30	41.10	43	58.90	2	25.00	6	75.00	3	37.50	5	62.50
9		3	37.50	5	62.50	9	37.50	15	62.50	22	55.00	18	45.00	15	38.46	24	61.54	32	50.79	31	49.21	2	25.00	6	75.00	2	25.00	6	75.00
		28	41.87	39	58.13	80	39.07	123	60.93	155	43.50	201	56.50	152	45.02	187	54.98	223	35.69	406	64.31	27	38.43	43	61.57	24	34.72	46	65.28
		TOTAL																											
1	WORK CULTURE	5	62.50	3	37.50	13	54.17	11	45.83	23	53.49	20	46.51	25	64.10	14	35.90	42	59.15	29	40.85	4	50.00	4	50.00	5	62.50	3	37.50
2		4	50.00	4	50.00	10	41.67	14	58.33	22	51.16	21	48.84	26	66.67	13	33.33	27	40.30	40	59.70	4	50.00	4	50.00	4	50.00	4	50.00
3		3	37.50	5	62.50	9	40.91	13	59.09	10	33.33	20	66.67	27	77.14	8	22.86	18	26.47	50	73.53	2	33.33	4	66.67	3	37.50	5	62.50
		12	50.00	12	50.00	32	45.58	38	54.42	55	45.99	61	54.01	78	69.30	35	30.70	87	41.97	119	58.03	10	44.44	12	55.56	12	50.00	12	50.00
		TOTAL																											

SUMMARY OF FINDINGS FROM QUESTIONNAIRES AND INTERVIEWS	
No.	PRIMARY FACTORS
1	Poor recruitment methods for employees where HSE knowledge and skills are not considered
2	Lack of competency for supervisors and other potential workforce.
3	Lack of HSE training, awareness for Management and hence no trainings organized / conducted down line.
4	Measurement of safety performance not considered for employees evaluation and appraisals.
5	Lack of motivation for employees due to poor living conditions and inadequacy of welfare standards on and off site.
6	Failure to conduct proper and routine audits and inspections at workplaces
7	Failure to take controls for Heat Stress conditions and workers health leading to sickness and ill health and injury
8	Non-consideration of language barriers where operatives from multiple nations and culture work together without proper communication and understanding.
9	Non – conduct of motivational programmes for enhancement of HSE skills and improvement of workplace safety culture.

No.	CONTRIBUTORY FACTORS
1	Lack of Management Commitment and non-availability and unawareness of HSE policies in the organization
2	Selection of substandard subcontractors for sake of commercial gains and transfer of contract risk
3	Failure of investigate accidents for prevention and recurrences and non-reporting of incidents
4	Non allocation of adequate resources for HSE issues thereby saving cost for the organization
5	HSE not considered in Management meetings and absence of site safety tours by site Managers.
6	Non conduct of Risk Assessments and no proper planning and methodology for even critical work executions.
7	Lack of enforcement from local authorities and non-conduct of HSE inspections by government authorities
8	Lack of imposition of disciplinary actions to violators and non-consideration of safety promoters.
9	Environment protection is not considered appropriately at work places as per required standards leading to sustainability concerns