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Exploring the Safety Management Practice of the construction industry of Pakistan

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Abstract

Safety management on construction sites had always been a major issue in the construction industry of Pakistan. The safety conditions on construction sites vary depending upon the nature of work and management commitment towards implementing safety on construction projects. There was no requirement for implementing safety management system from the government in the country. Construction companies were lacking a framework to follow for implementing safety on construction projects. The safety framework can help construction professionals to implement and improve construction safety practices on their project sites. This study presents the development of a framework for implementing safety on construction sites. An extensive literature review was carried out to design a suitable safety framework. The aim of this paper is to propose a system framework for construction site safety management and visualization system that reflects the continuous process of safety planning, educating, and inspection is studied for the successful management of the project. The questionnaire was circulated to the construction industry related firms and then results were interpreted after analysis done at SPSS software. At the end, suggestions were made for the betterment of the construction firms to maintain better safety practices.

Keywords: *Management Commitment, Documentation and Accident Prevention, Safety Training, Safety Inspection, Project Success*

1. Introduction

1.1. Background

For the growth of the country, every department of every industry should be working properly. As far as the developing countries are concerned, construction industry becomes very important(Ahmed[1] & Abid, 2013). Construction industry plays a vital role in the quick growth of the economy for any nation. If developing countries want to grow quickly then they should focus more on the construction industry. Construction industry includes hundreds of industries. Such as cement industry, steel industry, brick industry, crush stones industry, electrical cables industry, tiles industry, aluminum industry, pipe industry, glass industry, paint industry etc. If we are talking about the growth and support of the construction industry then we are talking about indirectly hundreds of industries that will grow along with the construction level growth (Ahmed[1] & Abid, 2013).

In Pakistan, the trend of improving the construction quality and using new technology in the construction industry has increased. Initially, there were very poor methods and design in the construction industry. As the PEC (Pakistan Engineering Council) started to use tight and tough criteria for engineers, things started to improve.

1.2. Identification of Gap

(Cheng, Ryan, & Kelly, 2012)has conducted the study between safety management practices and project performance in the construction industry. The study can be extended by measuring the relationship between management commitment, safety training, safety inspection, documentation and accident investigation, personal protection program with project success(Choudhry & Fang, 2008) have previously suggested that different aspects should also be studied in the construction industry of Pakistan.

1.3. Research Objectives

1) To explore different aspects of construction site safety management.
2) To what extent company's top management's approach/policies affect the development, implementation of safety, health and environmental management systems.
3) To find out the impact of safety training and site inspection procedures implementation to reduce accidents at sites.

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4) To find out existing documentation and accident prevention program for safety management.
5) To know the personal protection programs in the projects of Pakistan.

1.4. Research Questions

1) What is the role of management commitment for project success in construction projects of Pakistan?
2) How safety training and safety inspections affect project success?
3) How documentation and accident prevention make an impact on the construction industry project success?
4) How personal protection program affects the project success in the construction industry of Pakistan?

1.5. Delimitation of the study

First main thing was that this research work's scope was limited to the construction companies in Pakistan, and especially in the north region. It could have been extended to the others industries i.e. textile industry, telecom, IT industry, automobile etc. The second constraint was of time, over all three months' time period is a lesser time period to execute the same study to other industries.

2. Literature Review

2.1. The construction Industry

Construction industry plays a vital role in the quick growth of the economy for any nation. If developing countries want to grow quickly then they should focus more on the construction industry. Construction industry includes hundreds of industries. Such as cement industry, steel industry, brick industry, crush stones industry, electrical cables industry, tiles industry, aluminum industry, pipe industry, glass industry, paint industry etc. If we are talking about the growth and support of the construction industry then we are talking about indirectly hundreds of industries that will grow along with the construction level growth (Ahmed[1] & Abid, 2013)

2.1.1. Management Commitment

For the project success, management commitment is very important. (Babakus, Yavas, Karatepe, & Avci, 2003) stated that proper training will give confidence to the employees in the senior management. It's an indirect way of motivation to the staff and labor working at project sites. It surely improves the level of satisfaction of the staff. Along with that training helps in improving the productivity of the employees(Dorji & Hadikusumo, 2006). It also helps in finding employee's assessment for the assigned tasks(Babakus *et al.*, 2003).

2.1.2. Documentation and Accident Prevention

For the project success, proper documentation is very much necessary for accident prevention. Good construction firms have a habit of making a document of "Lessons Learnt" from the project. This document is very important for the upcoming projects and for the staff that will be handling the upcoming projects that will fall in this category when senior experience staff will not be available (Fadier & De la Garza, 2006).

2.1.3. Safety Training

For the project success safety training is of utmost importance. Proper training will give confidence to the employees in the senior management (Mohamed, 2002). It is an indirect way of motivation to the staff and labor working at project sites. While discussion with the project teams on different projects in the area of Rawalpindi and Islamabad, almost every member of project team knew about the terminology of HSE department or HSE Program (Ahmed[1] & Abid, 2013).

2.1.4. Safety Inspection

For the project success, safety inspection comes into play after safety training.(Feng, 2013) stated that there is an increasing trend in the construction industry that it is also evaluated that how many accidental events had occurred during the project completion. Government bodies also check out that how many events had occurred in previous projects before awarding any special project to any construction firm(Cooke-Davies, 2002).

2.1.5. Personal Protection Program

For the project success, personal protection program is also important along with the safety training and safety inspection programs. (Sparer & Dennerlein, 2013) stated that personal protection program includes in making a proper list of material required for the safety of the persons working at the project site. Proper dress code, helmet, shoes, gloves etc. everything that is necessary for their personal protection as per the international safety rules. And obviously, it is changed or varies according to the domain of the persons working at the project site.

2.1.6. Project Success

For the project success, all previously mentioned things are very much necessary. Every other variable plays a significant role in the project success of any industry. And especially when it comes to the construction industry, it plays a vital role. Management commitment is extremely important for project success. It is commonly observed that whenever the CEO of the firm is interested in any subsidiary, that business unit grows exponentially. On the other hand, other business units may not flourish properly in which CEO is not that much interested. If top

management is interested any project can touch the best limits of project success(Cooper, 2000).

2.1.6.1 Factors related to project

While planning it is of utmost importance that timeline should be properly focused. It is commonly noticed that any project that is big in size and it includes more than more than 100 activities, rarely completes in time. And whenever there are delays consultants and clients are ready to impose penalties. Monetary penalties and "loss of credibility" puts a very bad impact on the image of the contractor for upcoming projects. Another attribute which need to be emphasized is venture solidity. This is described as the ratio of the count of priority connections to the total number of actions(Tam, Zeng, & Deng, 2004). The allowance of sources, especially men hours, is suffering from the solidity(Lund & Aarø, 2004).

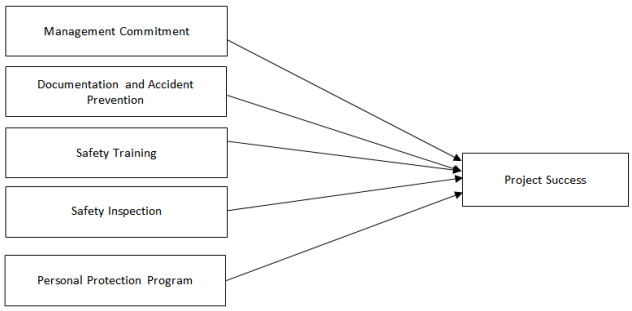
2.6.1.2 Factors related to organization

Everything can be completed in the allocated time if there is support by top management. Top management usually supports or shows interest in those projects in which they are guessing huge profit margins. Smaller projects are usually ignored by the top management. Or if there is a good official in the project, that is liked by the top management then management may be interested in even smaller projects(Belassi & Tukel, 1996).

2.6.1.3 Factors related to external environment

In this category, we can say that PEST analysis is very important. PEST analysis includes political, economic, social technology factors or even factors related to nature affect project performance. Bigger construction firms always tend to study the political, economic, social and technical challenges of the project before bidding for that project. Even climatically changes can also cause a huge change in the project timeline, budget, and quality(Belassi & Tukel, 1996).

2.2. Theoretical Framework



2.3. Hypotheses

H1: Management Commitment is significantly positively related to Project Success

H2: Documentation and accident prevention is significantly positively related to Project Success.

H3: Safety Training is significantly positively related to Project Success

H4: Safety Inspection is significantly positively related to Project Success

H5: Personal Protection Program is significantly positively related to Project Success

3. Research Methodology

3.1. Type of Investigation

The research study uses a cross-sectional approach to explore the study questions using a structured questionnaire. The research was divided into four phases: preliminary study, data collection, and data analysis and construction safety framework development. The research is being undertaken to identify the significance of safety management practices in the construction industry. This research work is an effort to empirically investigate the relationship of the relationship of independent variables to dependent variables in the construction companies in Pakistan.

3.2. Variables

This quantitative research is being conducted to help construction companies, researcher, and practitioners by identifying the significance of safety management practices and its impact on project success in the construction sites. We have chosen the independent variables of management commitment, documentation and accident prevention, safety training, safety inspection, personal protection program and their impact on the dependent variable of project success.

3.3. Instrument Development

The research instrument was developed by adapting questions from the research conducted by (Belout & Gauvreau, 2004) and (Ahmed[1] & Abid, 2013). The data collection was done through devising web-based questionnaire; questions were devised in a 5 point scale.

Construct	No. of items
Management Commitment	5
Documentation and Accident Prevention	3
Safety Training	4
Safety Inspection	2
Personal Protection Program	3
Project Success	5

The questions were already customized to meet the requirement of the construction sector. To ensure participation of project related staff members representing construction organizations, project related

information was requested before the start of the questions. Demographic information was requested like gender, age, qualification, professional experience (in years), academic background, current role and experience in the organization, professional status in the organization at the start of the questionnaire.

3.4. Population & Sample

The research focus areas are on projects implemented by construction companies in Pakistan. The population of the proposed study is all project oriented construction companies working across of Pakistan. In order to study the relationship among all described variables, various project-oriented construction companies of different sectors as mentioned above be requested for the collection of the required data and survey.

3.5. Unit of Analysis

Project team members, project managers and their supervisors of construction companies is the unit of analysis for the research. The individual respondents are asked to rank the listed factors for their level of criticality towards project success.

3.6. Sampling Strategy and Sample Selection

The research will be conducted from the targeted population of construction companies working in Pakistan. The sampling technique used for data collection is convenient random sampling as a type of non-probability sampling.

This technique was very helpful in getting the responses quickly, efficiently and economically. Overall response rates remained at 58% as we got a total of 188 responses out of 325.Overall2 responses were rejected. Data was transferred to the excel sheet for further analysis of the collected data.

Sr No.	Questionnaires details	Quantity/ Percentage
1	Requested	325
2	Total Responses	188
3	Total Responses Rejected	02
4	Valid Responses	186
5	Overall response rate percentage	58%
6	Valid response percentage	99%

3.7. Data Collection Method and Technique

The research instrument –questionnaire– was adapted to meet the requirements. The web-based questionnaires were developed and distributed via email among contacts and stakeholders. The web-based approach was adopted, as compared to a personal visit to get responses, for wider dissemination, prompt response and a shortage of time. Informal requests were made to direct contacts to further distribute the questionnaire to get more responses. To cope up the challenge of lack of response from any particular organization, the questionnaire will be distributed among various construction organizations across Pakistan. The analysis was done using the SPSS software and MS Excel and results were generated for interpretation.

3.8. Pilot Testing

In this study, the questionnaire was first distributed for pilot testing to measure the reliability of the items.

3.9. Reliability

The Cronbach's coefficient is calculated to determine the reliability and internal consistency of the data (Botta-Genoulaz *et al*., 2005). As per the review of previous studies done by the researchers and scholars, all of them agree that the value of the Cronbach's coefficient should be at 0.70 at minimum before the researchers apply any more test or analysis. The responses received from 31 respondents were analyzed to measure the reliability of the items. The reliability of all items was measured and the value is calculated as 0.963 for Management Commitment. Whereas, the individual reliability for each construct has been found as 0.838 for Safety Training, 0.709 for Safety Inspection, 0.764 for Personal Protection Program, 0.890 for documentation and accident prevention and 0.823 for project success. After finding out that the data is reliable, further analysis will be done. Details of the analysis are mentioned below.

Construct	Cronbach's Alpha	No. of items
Management Commitment	.963	5
Safety Training	.838	4
Safety Inspection	.709	2
Personal Protection Program	.764	3
Documentation and Accident Prevention	.890	3
Project Success	.823	5

4. Data Analysis and Results

4.1. Detail of Instruments

(Cheng *et al*., 2012) has conducted the study between safety management practices and project performance in the construction industry. The study can be extended by measuring the relationship between safety management practices, management commitment, site safety implementation, safety training, emergency response procedures, accident investigation, and safety review. (Choudhry, Fang, & Ahmed, 2008) have previously suggested that different aspects should also be studied in the construction industry of Pakistan. The research instrument was developed by adapting questions from the research conducted by (Ahmed[1] & Abid, 2013)for independent variables and (Belout & Gauvreau, 2004) for the dependent variable.

4.2. Demographics

4.2.1. Gender

For this research study, individuals as members of project team and project management team representing non-governmental organizations of Pakistan were targeted to achieve research objectives and assess the significance of project manager leadership skills. Out of 186 valid responses received from 78% (145 respondents) were male and 22% (41 respondents) were female.

4.2.2. Age of the Respondents

Out of 186 responses, 18.8% (35 respondents) were below 25 years, the majority of the respondent i.e. 51% (96 respondents) were in the age group of 26 – 35 years whereas 26.3% (49 respondents belonged to 3rd age group of 36 to 45 years. In the fourth group age from 46-55, there were only two (2) respondents that contributed with the percentage of 2.2%. The last age group consisted of people with the age above than 55 years it contributed with 1.1% of overall responses.

4.2.3. Qualification

The qualification of the respondents was recorded into four categories. 20% (33 respondents) were graduates, majority i.e. 37.57% (62 respondents) were holding Master's degree whereas 34.54% (57 respondents) were MS/ M.Phil, 7.87% (13 respondents). 21 of the respondents did not fill this portion.

4.2.4. Professional Experience

33.3% (50 respondents) have responded their experience as 1 – 3 years, 22% (33 respondents) respondents had 4 – 6 years' experience, 29.2% (44 respondents) had 7 – 10 years' experience whereas 15.3% (23 respondents) with the experience of more than 10 years participated in the survey. 36 of the respondents did not disclose their number of professional years of experience or they left this portion as blank.

4.2.5. Organization Type

The respondents representing project teams and project management team percentage details are 29% (54 respondents) were project managers, 43% (80 respondents) were a team leaders, 25.3% (47 respondents) was project coordinator and only 2.7% (5 respondents) were representing project team members.

Correlation Analysis

	MCM	STM	SIM	PPPM	DAPM	PSM
MCM	1	.814	.796	.709	.682	.554
STM		1	.402	.572	.505	.618
SIM			1	.664	.635	.559
PPPM				1	.521	.498
DAPM					1	.546
PSM						1

The above table shows the correlation analysis of dependent and independent variables with each other at 0.05 level of significance. The correlation between management commitment, safety training, safety inspection, personal protection program, documentation and accident prevention and project success is .814, .402, .664, .521 and .546 respectively which is a positive correlation with all the variables. The correlation of management commitment (MC)with safety training (ST), Safety Inspection (SI), personal protection program (PPP), documentation and accident prevention (DAP) and project success (PS) is .814, .796, .709, .682 and .554 respectively which is positive correlation with all the variables and project success.

The correlation of safety training (ST) with safety inspection (SI), personal protection program (PPP), documentation and accident prevention (DAP) and project success (PS) is .402, .572, .505 and .618 respectively which is a positive correlation with all the variables and project success.

The correlation of Safety inspection (SI) with personal protection program (PPP), documentation and accident prevention (DAP) and project success (PS) is .664, .635 and .559 respectively which is a positive correlation with all the variables and project success.

The correlation of personal protection program (PPP) with documentation and accident prevention (DAP) and Project Success (PS) is .521and .498respectively, which is a positive correlation with all the variables and project success.

The correlation of documentation and accident prevention (DAP) and Project Success (PS) is .546 which is a positive correlation with the project success.

Regression Analysis

Management Commitment and project success

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.656a	.391	.425	.685

ANOVA

Model Summary of ANOVA		Sum of Squares	Df	Mean Square	F	Sig. Value
1	Regression	17.248	1	17.248	77.139	.000[b]
	Residual	22.807	102	.224		
	Total	40.055	103			

In this relationship, the independent variable is management commitment (MC) which is taken as independent variable whereas project success is the dependent variable. The value of β, as measured by the product of project planning is .454 and p-value are 0.000 which is less than 0.05. It reflects that 1 unit change in management commitment will result in 0.454 unit change in project success so our result is significant.

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	4.124	.204	.023	20.227	.000
	MCM	.454	.058	.325	4.179	.000

So our 1st hypothesis has approved and we can conclude that the relationship between management commitment have significant positive effect on project success. In this study, R-square is 39.1% so we can conclude that overall risk predicts39.1% of project performance.

4.2.1. Safety Training and Project Success

Summary

Summary of the Model	R	R^2	Adjusted R^2	Standard Error of the Estimate
1	.511[a]	.321	.490	.473

ANOVA

Model Summary of ANOVA		Sum of Squares	df	Mean Square	F	Sig. Value
1	Regression	13.248	1	15.678	73.469	.000[b]
	Residual	21.807	102	.224		
	Total	40.055	103			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig. Value
		B	Standard Error	Beta		
1	(Constant)	1.845	.245		7.542	.000
	Safety Training	.448	.062	.656	8.783	.000

In this relationship, independent variable is Safety Training (ST) whereas the dependent variable is project success. The above-mentioned tables and analysis reflect the direct effect of ST as independent variable on dependent variable (project success). The β value is .448 whereas P-value is less than 0.05 (p-value is 0.000 which is significant). The table reflects that change in ST by 1 unit will bring change of .548 unit change in project success so it is concluded that Safety Training (ST) has significant direct effect on project success. R-square has been used to show the variation in Project success (DV) by explaining the variance in Safety training (IV). The analysis of this study shows that R-square is 32.1% so it is concluded that (ST) predicts 32.1% of project success.

4.2.2. Safety Inspection (SI) and project success (PS)

Summary

Summary of the Model	R	R^2	Adjusted R^2	Standard Error of the Estimate
1	.644[a]	.415	.409	.479

ANOVA

Model Summary of ANOVA		Sum of Squares	df	Mean Square	F	Sig. Value
1	Regression	16.607	1	16.607	72.240	.000[b]
	Residual	23.448	102	.230		
	Total	40.055	103			

In this relationship, independent variable is Safety Inspection (SI) whereas the dependent variable is project success. The above-mentioned tables and analysis reflect the direct effect of Safety Inspection (SI) as independent variable on dependent variable (project success). The β value is .507 whereas P-value is less than 0.05 (p-value is 0.000 which is significant). The table reflects that change in Safety Inspection (SI) by 1 unit will bring change of .507 unit change in project success so it is concluded that Safety Inspection (SI) has significant direct effect on project success. R-square has been used to show the variation in Project success (DV) by explaining the variance in Safety Inspection (IV). The analysis of this study shows that R-square is 41.5% so it is concluded that Safety Inspection (SI) predicts 41.5% of project success.

4.2.3. Personal Protection Program (PPP) and Project Success (PS)

Summary

Summary of the Model	R	R^2	Adjusted R^2	Standard Error of the Estimate
1	.689[a]	.475	.470	.454

ANOVA

Model Summary of ANOVA		Sum of Squares	df	Mean Square	F	Sig. Value
1	Regression	19.021	1	19.021	92.244	.000[b]
	Residual	21.033	102	.206		
	Total	40.055	103			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig. Value
		B	Standard Error	Beta		
1	(Constant)	1.700	.239		7.113	.000
	Personal protection Program	.567	.059	.689	9.604	.000

In this relationship, independent variable is applied Personal protection program (PPP) whereas the dependent variable is project success. The above-mentioned tables and analysis reflect the direct effect of Personal protection program (PPP) as independent variable on dependent variable (project success). The β value is .567 whereas P-value is less than 0.05 (p-value is 0.000 which is significant). The table reflects that change in Personal protection program (PPP) by 1 unit will bring change of .567 unit change in project success so it is concluded that applied Personal protection program (PPP) has significant direct effect on project success. R-square has been used to show the variation in Project success (DV) by explaining the variance in Personal protection program (IV). The analysis of this study shows that R-square is 47.5% so it is concluded that Personal protection program (PPP) predicts 47.5% of project success.

4.2.4. Documentation and accident prevention (DAP) and project success (PS)

Summary

Summary of the Model	R	R^2	Adjusted R^2	Standard Error of the Estimate
1	.865[a]	.749	.741	.318

ANOVA

Model Summary of ANOVA		Sum of Squares	df	Mean Square	F	Sig. Value
1	Regression	29.891	3	9.964	98.246	.000[b]
	Residual	10.040	99	.101		
	Total	39.932	102			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig. Value
		B	Standard Error	Beta		
1	(Constant)	.821	.985		.834	.406
	Documentation and accident prevention	.561	.268	.631	2.095	.039

In this relationship, independent variable is Documentation and accident prevention (DAP) has been taken into account whereas project success is dependent variable. The table reflects that change in Documentation and accident prevention (DAP) by 1 unit will bring change of .561 unit change in project success so it is concluded that Documentation and accident prevention (DAP) has significant direct effect on project success. R-square has been used to show the variation in Project success (DV) by explaining the variance in Documentation and accident prevention (IV). The analysis of this study shows that R-square is 47.5% so it is concluded that Documentation and accident prevention (DAP) predicts 74.9% of project success.

Conclusion and Recommendations

Discussion

1) Talking about overall communication with the project teams of the construction firm, almost every member of the team was aware of the fact that there is a dire need of safety management practices in the project completion phases in Pakistan(Ahmed[1] & Abid, 2013).
2) In the discussion phases with the top management of the construction firms, top management was also aware of the importance of safety management practices. Many members of top management (from different construction firms) had work experience from different countries. They knew that developed nations are following updated rules, regulations and policies for safety management practices. But very few of them are interested in copying the same safety practices to their projects in Pakistan. When they were inquired about why they tend to avoid safety management practices, answer was the same as expected, reduction in cost and maximizing the profits.(Ahmed[1] & Abid, 2013).
3) While discussing things with the project managers, they were also focusing the overall budget of the project. Especially the project managers of the high rise building seem to spend very less percentage of overall budgets at safety management practices. Because in case of high rise projects while using he safety management practices overall cost extends a lot. Bigger projects involve various safety issues and if project managers cover every aspects then cost raises too much (Ayomoh & Oke, 2006).
4) New upcoming firms usually avoid HSE departments as it requires new machinery and equipment. And for the running of these new machinery and equipment, they need specialized labor or operators. Specialized labor or operators are always charging more wages. Everything eventually add up to the cost of the project(Ahmed[1] & Abid, 2013).
5) Many contractors were just following these practices as optional part. They had proper instruments and equipment for HSE department, but they do not practice it properly. They only make this department active when any client, consultants of architect make it a mandatory clause in the contractual agreement. Otherwise they avoid using these techniques(Ahmed[1] & Abid, 2013).
6) While discussion with the project teams at different projects in the area of Rawalpindi and Islamabad, almost every member of project team knew about the terminology of HSE department or HSE Program (Ahmed[1] & Abid, 2013). Everyone knew the importance of health, safety and environment management system. A few of the good construction companies i.e. pak gulf construction (builder and developer of Centurus), Aestral Construction (builder of World bank Project), Kohistan Builder (Builder of Zarkoon heights flats at G-15, Kohistan Tower in Sadar Rawalpindi), Bahria Town (Multiple projects) etc, have properly developed HSE departments. Many other firms that are trying to be in the list of top construction firms of Pakistan, also trying to develop proper HSE department. Firms like Qavi Engineering (builders of Bacha Khan airport, KPK), Zealcon Engineering (Bhasha Dam project), Chinese Firms (projects of Baynazir Airport Fateh Jung), Islamabad Heights (apartments in G-15), Redsun associates (Multiple Projects in Islamabad), MPCHS – Multi professional cooperative housing society (Builders and developers of E-11, B-17, D-17, F-17), Minawa Builders (Minawa Apartments near Murree), Darwaish Engineering (projects in NUST University), Tahir Builders (projects in Air Headquarters Islamabad), Innovative Marketing company (Multiple domestic projects) etc, are trying to develop manage and develop proper HSE departments.
7) Many contractors were just following these practices as optional part. They had proper instruments and equipment for HSE department, but they do not practice it properly. They only make this department active when any client, consultants of architect make it a mandatory clause in the contractual agreement.

Otherwise they avoid using these techniques(Ahmed[1] & Abid, 2013).While discussion with the project teams at different projects in the area of Rawalpindi and Islamabad, almost every member of project team knew about the terminology of HSE department or HSE Program (Ahmed[1] &Abid, 2013). Everyone knew the importance of health, safety and environment management system. A few of the good construction companies i.e. pak gulf construction (builder and developer of Centurus), Aestral Construction (builder of World bank Project), Kohistan Builder (Builder of Zarkoon heights flats at G-15, Kohistan Tower in Sadar Rawalpindi), Bahria Town (Multiple projects) etc, have properly developed HSE departments. Many other firms that are trying to be in the list of top construction firms of Pakistan, also trying to develop proper HSE department. Firms like Qavi Engineering (builders of Bacha Khan airport, KPK), Zealcon Engineering (Bhasha Dam project), Chinese Firms (projects of Baynazir Airport Fateh Jung), Islamabad Heights (apartments in G-15), Redsun associates (Multiple Projects in Islamabad), MPCHS – Multi professional cooperative housing society (Builders and developers of E-11, B-17, D-17, F-17), Minawa Builders (Minawa Apartments near Murree), Darwaish Engineering (projects in NUST University), Tahir Builders (projects in Air Headquarters Islamabad), Innovative Marketing company (Multiple domestic projects) etc, are trying to develop manage and develop proper HSE departments.

8) New upcoming firms usually avoid HSE departments as it requires new machinery and equipment. And for the running of these new machinery and equipment, they need specialized labor or operators. Specialized labor or operators are always charging more wages. Everything eventually add up to the cost of the project (Ahmed[1] &Abid, 2013).
9) Many contractors were just following these practices as optional part. They had proper instruments and equipment for HSE department, but they do not practice it properly. They only make this department active when any client, consultants of architect make it a mandatory clause in the contractual agreement. Otherwise they avoid using these techniques (Ahmed[1] &Abid, 2013).
10) Main purpose should be to enhance and increase knowledge base of the workers working at the project site. For this purpose "lessons learnt" document should be properly managed, it will help the firm in future if they complete the similar project. And it will also help the new joining employee to teach from the mistakes of their team members who worked at that project. It's an excellent method to transfer knowledge

Conclusion

It has been a wonderful experience to work at safety management practices in the construction industry of Pakistan. Our overall focus was in the area of Rawalpindi and Islamabad. Conclusion can be summed up after doing all the research work is as follow;

1) Top management really needs to work at the proper development of health, safety and environment program.
2) It can help the construction company in many ways. Proper development of health, safety and environment program will help in overall brand recognition of the construction firm.
3) Proper development of HSE department will encourage the more skilled and talented employees to apply for the jobs in the construction company. It will help in overall contribution to the human resource department.
4) Properly developed HSE department will help in winning next upcoming projects. As consultants, architects and clients always prefer that contractor who is fully equipped with latest machinery required for HSE department. Main purpose behind this is it will enhance the chances to reduce the accidental events while completion of the project. If a single accidental event occurs at project site, it badly affects the overall repute of the firm in a very bad way. And as this is the time of media, a slight mistake can alter the project's repute in a disastrous way.
5) Safety administrative chart needs to be exposed on project place.
6) Proper trained staff should be appointed at project site but right after they complete their training session required to complete their job.
7) In case the project is sublet to the subcontractor, then it is a dire need to forcefully bind them to follow the same HSE rules as committed by main contractors to the client, architect and the consultant of the project.
8) If a construction firm is properly following HSE rules, they should place themselves as benchmark for new firms in the construction industry.
9) Top management should allocate proper budget for the training of new employee.
10) After safety training, safety inspections should be made mandatory at regular intervals.
11) After safety training and safety inspection, safety performance should also be checked at regular intervals.
12) Good firms use the techniques of safety bulletins along with different awards schemes at the project sit to motivate the workers working at the project site.
13) Proper documentation should be made of every event that happens at the project site. It will help the project manager in finding out the reason behind that accident. Eventually it will add up the knowledge base of the construction company. At the end every single member of the project team will get benefited from this document.
14) Proper documentation will also help in getting attention from top management.

15) Discussion with the member of project team reveled that overall situation related to the HSE department has improved in the last five (5) years in the construction industry of Pakistan.
16) In Pakistani construction safety issues should be given a proper clause in the BOQ (bill of quantities) of the project. Proper safety measures will ensure quality work at the project site.
17) Overall conditions in Pakistani construction industry are improving. I.e. EIA report is now of utmost importance for every project from the environmental POV.
18) Small contractors do not bother about safety management practices. If this clause is made mandatory then they will also act on the same. It never too late to begin.
19) Many firms have been working at safety practices but in their head offices. There is no "Safety related literature and handbooks" available at the project site. Project site should be enrich by safety related literature and books.

Recommendations for Future Research

The present research study focused on only five factors, more factors should also be empirically examined in the context of non-governmental organizations. Same project success factors should also be tested in projects implemented by government owned institutions. Demographic attributes like age, gender, professional experience, employment status and others should also enlisted as moderator to measure their role on project success. Project teams, total members of project team and other such factors should also be studied in the similar context can increase the generalizability of the study. A few other variables can also be recommended for future studies i.e.

- Safety Policy, Rules
- Organization, Responsibility and Safety Management System
- Compliance with Safety Legislations
- Safe Working Environment
- Safety Induction and Performance
- Monitoring of Contractors
- Safety of Subcontractors
- Emergency Response Procedures
- Safety Review
- Accident Investigation

References

[1]. Ahmed, W., & Abid, M. M. (2013). Development of a framework for implementing safety on construction sites. DEVELOPMENT, 1(3).
[2]. Ayomoh, M., & Oke, S. (2006). A framework for measuring safety level for production environments. Safety science, 44(3), 221-239.
[3]. Babakus, E., Yavas, U., Karatepe, O. M., & Avci, T. (2003). The effect of management commitment to service quality on employees' affective and performance outcomes. Journal of the Academy of marketing Science, 31(3), 272-286.
[4]. Belassi, W., & Tukel, O. I. (1996). A new framework for determining critical success/failure factors in projects. International Journal of Project Management, 14(3), 141-151.
[5]. Belout, A., & Gauvreau, C. (2004). Factors influencing project success: the impact of human resource management. International Journal of Project Management, 22(1), 1-11.
[6]. Cheng, E. W., Ryan, N., & Kelly, S. (2012). Exploring the perceived influence of safety management practices on project performance in the construction industry. Safety science, 50(2), 363-369.
[7]. Choudhry, R. M., & Fang, D. (2008). Why operatives engage in unsafe work behavior: Investigating factors on construction sites. Safety science, 46(4), 566-584.
[8]. Choudhry, R. M., Fang, D., & Ahmed, S. M. (2008). Safety management in construction: Best practices in Hong Kong. Journal of professional issues in engineering education and practice, 134(1), 20-32.
[9]. Cooke-Davies, T. (2002). The "real" success factors on projects. International Journal of Project Management, 20(3), 185-190.
[10]. Cooper, M. (2000). Safety management in the emergency response services. Risk Management, 2(2), 39-49.
[11]. Dorji, K., & Hadikusumo, B. H. (2006). Safety management practices in the Bhutanese construction industry. Journal of Construction in Developing Countries, 11(2), 53-75.
[12]. Fadier, E., & De la Garza, C. (2006). Safety design: Towards a new philosophy. Safety science, 44(1), 55-73.
[13]. Feng, Y. (2013). Effect of safety investments on safety performance of building projects. Safety science, 59, 28-45.
[14]. Lund, J., & Aarø, L. E. (2004). Accident prevention. Presentation of a model placing emphasis on human, structural and cultural factors. Safety science, 42(4), 271-324.
[15]. Mohamed, S. (2002). Safety climate in construction site environments. Journal of construction Engineering and Management, 128(5), 375-384.
[16]. Sparer, E. H., & Dennerlein, J. T. (2013). Determining safety inspection thresholds for employee incentives programs on construction sites. Safety science, 51(1), 77-84.
[17]. Tam, C., Zeng, S., & Deng, Z. (2004). Identifying elements of poor construction safety management in China. Safety science, 42(7), 569-586.