Application of Safety Management in Construction System

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ABSTRACT

Purpose- The research paper aims to analyze the factor that affects building safety and rate them on the basis of the responses given to their effect on the productivity of building projects in India.

Design/methodology/approach- The study was conducted via a structured questionnaire which was sent to 150 professionals employed in the Indian construction industry. This questionnaire asked the respondents through a literature review to provide a score for the 23 characteristics identified as causing productivity losses in the construction sector. On the Likert scale of 1 to 5 we were expected to score attributes. Data extracted and analyzed using the matrix and factor analysis of the relative values.

Findings- Factors include poor site preparation, lack of funding, broken supply chain, lack of commitment, lack of preparedness, lack of strategic knowledge and inadequate site knowledge, lack of Personal Protective Equipment (PPE), Lack of safety engineer, lack of knowledge of contract conditions to the contractors and subcontractors for the Genuine Truth of agreements between two parties whether it is legal or not which they are practicing during tendering.

Research limitations- Studies based on the input obtained from the questionnaire and the number of respondents is 11, with an answer rate of 40%. More thorough analysis is required to evaluate control mechanisms for the top three main factors listed in the report.

Key Words*:* safety Management, application tool safety, Construction factors questionnaires, SPSS.

Indian construction industry.

I. INTRODUCTION

Data on risk control expectations and patterns in Indian buildings reveals that protection is perceived to be one of the top risk assignments and is valued at 8.3 on a 10-point scale. Through awarding the highest ranking to protection, contractors believe that they are and are continue to be fully responsible for this risk in the future. That is well understood that accidents have major financial and social implications for the construction industry. Building accidents can cause many problems, such as worker demotivation; disruption of site activity; delays in project progress; and detrimental impact on the construction industry's overall cost, performance, and reputation. In an growing globalizing world, safety quality is a core priority for manufacturing to become an environmental competitor. Occupational injuries may result in permanent injury or death and/or economic damage, or both. Proactive safety measures such as hazard detection, safe housekeeping, planning and better personal protection equipment can prevent workplace injuries. Indian construction industry's contribution to GDP has averaged around 8 per cent in the last 5 years (India's 12th Five-Year Planning Commission, 2015). The Indian building industry supplies roughly. Work. Work. 41 million jobs and second place in the supply of employment after the Indian agriculture industry. The Indian construction industry has grown considerably over the last 15 years and has enjoyed the benefits of an growing demand and FDI from other developing countries, but still faces the challenge of low construction performance, delays in the implementation of projects, and a number of over experienced projects. Building industry falls mainly under the following domains or sub-sectors. The key purpose of this study is to carry out research into health promotion practices in small and medium-sized businesses in India. The secondary goal is to review security protocols and to discuss best practices in this particular area. The paper also aims to explain the reasons and challenges to development and the economic, security and health status of small and medium-sized enterprises in the various countries of India.

The first aim of this analysis was to assess the view of employees about the scales of the nine processes in safety management (foreman or worker, safety organization, safety training, inspecting hazardous condition, personal, protection program ,plant equipment ,safety promotion, management behavior) and Employees self-reported protection actions in the chosen companies and to develop their authenticity and reliability. The second aim was to compare the degrees of variables in the safety management among organizations. Following hypotheses were formulated for this objective.

H_{01}. Is it appropriate or not to assign a safety officer in a construction management firm to inform and assist the staff and to handle incident avoidance, disability, work-related injury and loss of property, delay in project.

H_{02}. There is certain relationship that safety officers have to work under pressure from project managers without considering thar outcomes in accidents for safety measures.

H_{03}. The requirement for the new functionality technology plays a major role in protection without considering price as one of the considerations.

H_{04}. There is no connection between owner-to-contractor agreements and contract-to-sub-contractor agreements by neglecting protection as one consideration in securing the lower rate contract.

II. LITERATURE REVIEW

S. NO.	PAPER	AUTHOR	YEAR	REASEARCH WORK
1	The use of questionnaires in safety culture research – an evaluation	Frank W. GULDENMUND	2007	The protection environment (attitudes) and safety culture are not separate entities but rather different approaches to the same aim of assessing the value of security within an entity.
2	Structural equation model for investigating factors affecting delay in Indian construction projects	HEMANTA DOLOI, ANIL SAWHNEY AND K.C. IYER	2012	Contrary to the presumption that the contractor is the only party liable for halting construction ventures, the findings strongly illustrate the value of the role of clients and technological experience in preparing to achieve adequate time-limit output in Indian ventures.
3	Safety management systems: Performance differences between adopters and non-adopters	Eleonora BOTTANI, Luigi Monica, Giuseppe VIGNALI	2009	The aim of this paper is to determine, by an analytical analysis, if the performance of the adopting and non-adopting safety management systems (SMSs) companies is statistically different.
4	Safety Management Practices in the Bhutanese Construction Industry	Kin DORJI and Bonaventura H. W. HADIKUSUMO	2006	Problems such as the absence of health laws and guidelines, the poor importance of protection, the lack of safety data at building sites, the lack of qualified personnel, the lack of safety preparation, the lack of reported and structured security management structures. In addition, the report also brings out guidelines for secure building in Bhutan.
5	Safety Management Practices in Small and Medium Enterprises in India	Seema Unnikrishnan, Rauf Iqbal, Anju Singh, INDRAYANI	2014	Competition between small and medium-sized businesses was identified to be a significant factor for the SMEs to adopt safety measures. The study's main contribution has been creating awareness in the SMEs that engaged in the project on safety concerns.
6	Safety incentive and penalty provisions in Indian construction projects and their impact on safety performance	Abid Hasan & Kumar Neeraj Jha	2013	The six considerations derived from performing factor analysis are: reward delivery process, adequate worker preparation, careful attention to hazardous conditions, the position of the protection committee and subcontractors, specialist

				works and protection EQUIPMENTS, and the right I / P type.
7	Prevention through design and construction safety management strategies for high performance sustainable building construction	Katie Shawn DEWLANEY & Matthew Hallowell	2012	Practitioners will utilize the results and the framework to enhance health for construction employees, an element of protection that the LEED system does not actually tackle.
8	Overview and analysis of safety management studies in the construction industry	ZHIPENG ZHOU, YANG MIANG GOH, QIMING Li	2015	Four key study results were obtained including insights on building safety analysis, developments in building safety study, advanced technological implementations of building protection, and flow of protection knowledge.
9	Integrated management systems: a single management system solution for project control	ALAN GRIFFITH	2000	This paper explores the function, features, assets and aim of a single system solution for quality environment and safety and considers its position and its importance for the organization of contracts.
10	Improved AHP Method and Its Application in Risk Identification	FENGWEI LI; KOK KWANG PHOON, F. ASCE, XIULI DU; AND MINGJU Zhang	2013	The findings of the test demonstrate that IAHP is superior to AHP in terms of compatibility with CM, quality in knowledge retrieval and ease in functional implementation.
11	Identification an Association of High-Priority Safety Management System Factors and Accident Precursors for Proactive Safety Assessment and Control	ESTACIO PEREIRA, SEUNGJUN AHN, A.M. ASCE, SANGUK HAN, A. M. ASCE, SIMAAN ABOURIZK	2018	This paper suggests the usage of a risk assessment method to consider from a systemic viewpoint the uncertainty between SMS variables and incident precursors.
12	Framework for Continuous Assessment and Improvement of Occupational Health and Safety Issues in Construction Companies	SHAHRAM MAHMOUDI, FAKHRADIN GHASEMI, IRAJ MOHAMMADFAM, ESMAEIL Soleimani	2014	Study findings indicate that the relative significance of the key elements and their associated influences vary between level of company and level of the project: leadership and dedication are the most important elements at the level of the enterprise, while risk evaluation and management are most relevant at the level of the project.
13	Factors influencing the implementation of a safety management system for construction sites	ZUBAIDAH Ismail, Samad DOOSTDAR, Zakaria Harun	2012	Suggestions and suggestions were suggested on the configuration of machinery and better work processes and procedures to increase the quality and competitiveness of construction employees. Management has been advised to educate their workers more about health concerns.
14	Factor analysis-based studies on construction workplace safety management in China	D.P. Fang, F. XIE, X.Y. Huang, H. Li	2002	The system of factor analysis was used, and identified and represented 11 variables. Finally, the established variables were used to allow further observations in certain methodological approaches.

15	Factors affecting the performance of construction projects in the Gaza strip	Adnan ENSHASSI, SHERIF Mohamed & Saleh ABUSHABAN	2009	The purpose of this paper is to recognize variables that influence the success of local construction projects and to create expectations of their relative significance.
16	Factors affecting the implementation of green specifications in construction	Patrick T.I. Lam, Edwin H.W. Chan, C.S. Poon, C.K. Chau, K.P. Chun	2010	The subtle differences between stakeholders in identifying construction work were identified using the Mann – Whitney U-test, even with the high quality of the responses among the classes. In addition, five separate variables were classified by factor review for effective green construction design.
17	Developing a model to measure the effectiveness of safety management systems of construction sites	Evelyn Ai Lin Teo, Florence Yean YNG Ling	2006	The Analytic Hierarchy Method (AHP) and the Factor Analysis were used to help define the most significant variables and characteristics that influence health. The model was developed using the MAVT (Multi-attribute Meaning Model) methodology. It was also subject to validation via site audits.
18	Construction safety assessment framework for developing countries: a case study of Sri Lanka	PRIYADARSHANI, Kanchana, KARUNASENA, GAYANI and Jayasuriya, SAJANI	2013	The findings indicate that a construction protection standard will be interpreted across six main classes of factors: management participation, management behaviour, execution, complexity of the project, human interaction and economic activity. Management dedication is the most powerful force influencing building safety and includes enforcing internal protection procedures, defining protection roles at all stages, etc.
19	Construction safety in Kuwait: issues, procedures, problems, and recommendations	N.A. KARTAM, I. Flood, P. KOUSHKI	2000	The analysis examines the position played by the numerous building actors in the protection programs and policies, taking into consideration costs and time performance.
20	Construction Job Safety Analysis	Ophir ROZENFELD, Rafael Sacks, YEHIEL Rosenfeld, HADASSA Baum	2010	Within the scope of study, the system was built for a lean approach to safety management in building, which included the capacity to anticipate fluctuating safety risk rates to promote safety sensitive preparation and dragging safety management activities to the locations and times when they are most successful.
21	Assessment of safety performance in Indian industries using fuzzy approach	G.S. BERIHA, B. Patnaik, S.S. Mahapatra, S. PADHEE	2012	This paper provides an artificial intelligence method for forecasting different forms of (fatal to minor) injuries in an unpredictable setting.
22	Analysis of Material Handling Safety in construction Sites and Counter measures for Effective Enhancement	N. Anil Kumar, M. Sakthivel, R. K. ELANGOVAN, and M. ARULARASU	2015	This paper analyses the protection management processes at construction sites via questionnaire surveys with workers, relating primarily to material handling equipment health.
23	analysis of major risks in construction projects	K. JAYASUDHA and B. VIDIVELLI	2016	The research thus explored the understanding of the different forms of preparation strategies and methods used on building sites by experts in the construction industry

24	A framework for evaluating the safety performance of construction contractors	S. Thomas Ng, Kam Pong Cheng R. Martin SKITMORE	2005	In this article, a questionnaire survey performed in Hong Kong explores the value of the SPE variables.
25	Analysing Inventory Material Management Control Techniques on Residential Construction Project Using SPSS	T. SUBRAMANI, T. SURESH Kumar	2018	A well-designed inventory handling by prompt distribution and supplies to the job site and increased staff preparation strengthened worker efficiency, scheduled scheduling and reduced costs.

III. REASEARCH METHODOLOGY

Figure a indicates the methods followed

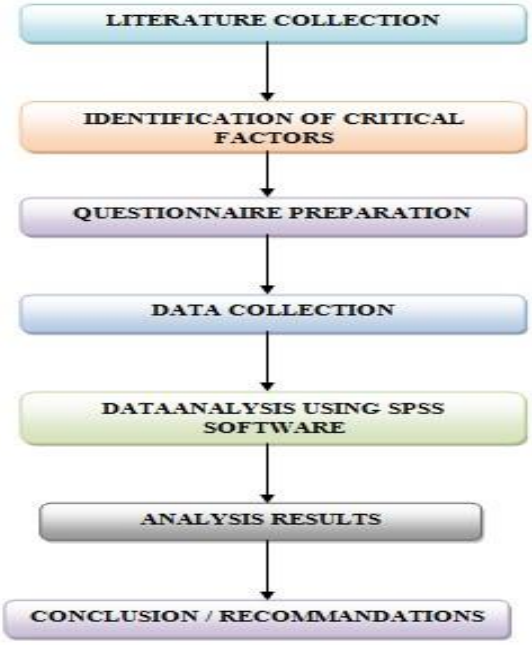

FIGURE: Methodology

Specific research methods have been used to collect the information and data required in relation to this study. Among these are field visits, interviews and questionnaires.

IV. SOFTWARE USED

The SPSS is a program framework for interpreting and evaluating data of all sorts. Additionally, such figures will come from nearly every source: scientific studies, a patron data list, even archives of a website's server log. SPSS must access all document codecs, usually used to spread documents based on MS Excel or Office.

V. QUESTIONNAIRE SURVEY

Data analysis

First study was performed for descriptive statistics and reliability analysis of the observed variables, for the assessment of established variables

Table:1 descriptive statistics

Descriptive Statistics							
	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
SX	11	1.18	0.405	1.923	0.661	2.037	1.279

exp	11	1.64	0.809	0.847	0.661	-0.764	1.279
RC	11	2.00	0.775	0.000	0.661	-1.111	1.279
PT	11	2.00	1.414	1.296	0.661	0.600	1.279
Comp	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q4	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q7	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q9	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q10	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q12	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q13	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q15	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q31	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q42	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q48	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q49	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q54	11	2.73	0.905	-0.344	0.661	-0.054	1.279
Q23	11	2.91	0.701	-2.009	0.661	7.016	1.279
Q11	11	3.00	0.447	0.000	0.661	5.000	1.279
Q25	11	3.00	0.447	0.000	0.661	5.000	1.279
Q43	11	3.00	1.000	0.000	0.661	2.067	1.279
Q3	11	3.09	0.944	-1.081	0.661	1.206	1.279
Q17	11	3.09	0.944	-1.081	0.661	1.206	1.279
Q28	11	3.09	0.944	-0.209	0.661	3.474	1.279
Q33	11	3.09	0.944	-1.081	0.661	1.206	1.279
Q40	11	3.09	0.302	3.317	0.661	11.000	1.279
Q50	11	3.09	0.944	-1.081	0.661	1.206	1.279
Q45	11	3.18	0.751	1.404	0.661	3.529	1.279
Q41	11	3.27	1.009	-1.374	0.661	1.315	1.279
Q26	11	3.27	0.786	0.935	0.661	1.649	1.279
Q53	11	3.36	0.505	0.661	0.661	-1.964	1.279
Q6	11	3.45	0.820	-1.153	0.661	-0.254	1.279
Q18	11	3.45	0.522	0.213	0.661	-2.444	1.279
Q20	11	3.45	0.820	-1.153	0.661	-0.254	1.279
Q24	11	3.45	0.688	-0.932	0.661	0.081	1.279
Q34	11	3.45	0.522	0.213	0.661	-2.444	1.279
Q36	11	3.45	0.820	-1.153	0.661	-0.254	1.279
Q51	11	3.45	0.522	0.213	0.661	-2.444	1.279
Q5	11	3.55	0.522	-0.213	0.661	-2.444	1.279
Q19	11	3.55	0.522	-0.213	0.661	-2.444	1.279
Q35	11	3.55	0.522	-0.213	0.661	-2.444	1.279
Q52	11	3.55	0.522	-0.213	0.661	-2.444	1.279
Q2	11	3.73	0.647	0.291	0.661	-0.208	1.279
Q16	11	3.73	0.647	0.291	0.661	-0.208	1.279
Q21	11	3.73	0.647	0.291	0.661	-0.208	1.279
Q32	11	3.73	0.647	0.291	0.661	-0.208	1.279
Q37	11	3.73	0.647	0.291	0.661	-0.208	1.279
Q8	11	3.91	0.944	0.209	0.661	-2.069	1.279
Q22	11	3.91	0.944	0.209	0.661	-2.069	1.279

Q38	11	3.91	0.944	0.209	0.661	-2.069	1.279
Q39	11	3.91	0.944	0.209	0.661	-2.069	1.279
Q14	11	4.00	0.632	0.000	0.661	0.417	1.279
Q30	11	4.00	0.632	0.000	0.661	0.417	1.279
Q47	11	4.00	0.632	0.000	0.661	0.417	1.279
Q1	11	4.09	0.831	-0.190	0.661	-1.485	1.279
Q27	11	4.36	0.505	0.661	0.661	-1.964	1.279
Q29	11	4.36	0.505	0.661	0.661	-1.964	1.279
Q44	11	4.36	0.505	0.661	0.661	-1.964	1.279
Q46	11	4.36	0.505	0.661	0.661	-1.964	1.279
Valid N (listwise)	11						

Reliability of any instrument is defined as the degree to which the measuring instrument on repeated tests yields the same result (Carmines and Zeller, 1990). It is the proportion of observed variance in score which is due to real variance in score. The precision of a measuring instrument is determined by many methods. These include method of test – retest, similar types, method of split-halves, and method of internal consistency. The theories such as true and error scores, parallel types and domain sampling are based on these methods. Of all these methods, the internal method of consistency is regarded as the most efficient, especially in field studies.

Case Processing Summary			
		N	%
Cases	Valid	11	100.0
	Excluded [a]	0	0.0
	Total	11	100.0
a. Listwise deletion based on all variables in the procedure.			

Table :2
A total 59 questions have been asked in which there means have been written in increasing order

Table: 3

Reliability Statistics	
Cronbach's Alpha	N of Items
0.824	59

The internal accuracy is calculated using a coefficient of reliability, Cronbach's alpha (a) (Cronbach, 1951). The criteria for demonstrating good internal consistency with proven scales is assumed to be a value with 0.70 or above (Nunnally, 1978). A meaning of 0.60 or above is often regarded as important for exploratory work (Hair et al., 1998). Table indicates that all six safety management practices and safety behaviours have good reliability which implies that the survey items were suitable measures of their respective constructs.

Table :4

Item Statistics			
	Mean	Std. Deviation	N
SX	1.18	0.405	11
exp	1.64	0.809	11
PT	2.00	1.414	11
RC	2.00	0.775	11
Comp	2.73	0.905	11
Q1	4.09	0.831	11
Q2	3.73	0.647	11
Q3	3.09	0.944	11
Q4	2.73	0.905	11
Q5	3.55	0.522	11
Q6	3.45	0.820	11
Q7	2.73	0.905	11

Q8	3.91	0.944	11
Q9	2.73	0.905	11
Q10	2.73	0.905	11
Q11	3.00	0.447	11
Q12	2.73	0.905	11
Q13	2.73	0.905	11
Q14	4.00	0.632	11
Q15	2.73	0.905	11
Q16	3.73	0.647	11
Q17	3.09	0.944	11
Q18	3.45	0.522	11
Q19	3.55	0.522	11
Q20	3.45	0.820	11
Q21	3.73	0.647	11
Q22	3.91	0.944	11
Q23	2.91	0.701	11
Q24	3.45	0.688	11
Q25	3.00	0.447	11
Q26	3.27	0.786	11
Q27	4.36	0.505	11
Q28	3.09	0.944	11
Q29	4.36	0.505	11
Q30	4.00	0.632	11
Q31	2.73	0.905	11
Q32	3.73	0.647	11
Q33	3.09	0.944	11
Q34	3.45	0.522	11
Q35	3.55	0.522	11
Q36	3.45	0.820	11
Q37	3.73	0.647	11
Q38	3.91	0.944	11
Q39	3.91	0.944	11
Q40	3.09	0.302	11
Q41	3.27	1.009	11
Q42	2.73	0.905	11
Q43	3.00	1.000	11
Q44	4.36	0.505	11
Q45	3.18	0.751	11
Q46	4.36	0.505	11
Q47	4.00	0.632	11
Q48	2.73	0.905	11
Q49	2.73	0.905	11
Q50	3.09	0.944	11
Q51	3.45	0.522	11
Q52	3.55	0.522	11
Q53	3.36	0.505	11
Q54	2.73	0.905	11

Table 5: inter correlation have been summarized below the table

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SX	190.82	187.564	0.079	0.824
exp	190.36	194.855	-0.306	0.833
PT	190.00	188.200	-0.041	0.834
RC	190.00	177.800	0.494	0.815
Comp	189.27	171.818	0.673	0.810
Q1	187.91	181.291	0.296	0.820
Q2	188.27	184.018	0.237	0.821
Q3	188.91	182.891	0.189	0.823
Q4	189.27	171.818	0.673	0.810
Q5	188.45	188.273	0.004	0.825
Q6	188.55	177.273	0.488	0.815
Q7	189.27	171.818	0.673	0.810
Q8	188.09	191.091	-0.130	0.831
Q9	189.27	171.818	0.673	0.810
Q10	189.27	171.818	0.673	0.810
Q11	189.00	183.200	0.430	0.819
Q12	189.27	171.818	0.673	0.810
Q13	189.27	171.818	0.673	0.810
Q14	188.00	184.000	0.245	0.821
Q15	189.27	171.818	0.673	0.810
Q16	188.27	184.018	0.237	0.821
Q17	188.91	182.891	0.189	0.823
Q18	188.55	188.873	-0.038	0.826
Q19	188.45	188.273	0.004	0.825
Q20	188.55	177.273	0.488	0.815
Q21	188.27	183.818	0.249	0.821
Q22	188.09	191.091	-0.130	0.831
Q23	189.09	183.091	0.265	0.821
Q24	188.55	178.673	0.514	0.816
Q25	189.00	183.200	0.430	0.819
Q26	188.73	196.818	-0.401	0.835
Q27	187.64	183.655	0.343	0.820
Q28	188.91	199.091	-0.427	0.839
Q29	187.64	183.655	0.343	0.820
Q30	188.00	184.000	0.245	0.821
Q31	189.27	171.818	0.673	0.810
Q32	188.27	184.018	0.237	0.821
Q33	188.91	182.891	0.189	0.823
Q34	188.55	188.873	-0.038	0.826
Q35	188.45	188.273	0.004	0.825
Q36	188.55	177.273	0.488	0.815
Q37	188.27	183.818	0.249	0.821
Q38	188.09	191.091	-0.130	0.831

Q39	188.09	191.091	-0.130	0.831
Q40	188.91	187.891	0.075	0.824
Q41	188.73	177.618	0.370	0.818
Q42	189.27	171.818	0.673	0.810
Q43	189.00	198.200	-0.376	0.838
Q44	187.64	183.655	0.343	0.820
Q45	188.82	195.764	-0.368	0.834
Q46	187.64	183.655	0.343	0.820
Q47	188.00	184.000	0.245	0.821
Q48	189.27	171.818	0.673	0.810
Q49	189.27	171.818	0.673	0.810
Q50	188.91	182.891	0.189	0.823
Q51	188.55	188.873	-0.038	0.826
Q52	188.45	188.273	0.004	0.825
Q53	188.64	185.455	0.210	0.822
Q54	189.27	171.818	0.673	0.810

Abbreviations used: sex (SX), experience (exp), project type (PT), regular client (RC), Nature of company (comp), number of questions (Q)

Table:6

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
192.00	188.600	13.733	59

From analysis calculation Cronbach's Alpha value is 0.824. if some questions with specific values will be deleted then Alpha value can be increased. To get the value of alpha as 0.831 question number 38 and 39 shall be deleted, that means on these factors more value should be given by each of the nine factors.

CONSTRUCTION SAFETY MANAGEMENT QUESTIONNAIRES

Kindly tick (✔)the items below on a 1-5 rating scale

Background information

(please tick one appropriate box unless otherwise stated) DATE:

SEX (SX)	Male [1]	☐	Female [2]	☐	Other [3]	☐
Work experience(exp)	Less than 5 YR [1]	☐	5-10 years [2]	☐	Over 10 years [3]	☐
Your most familiar project type (PT)	Residential [1]	☐	Commercial [3]	☐	Industrial [5]	☐
	Institutional [2]	☐	E& M [4]	☐	Civil work [6]	☐
	Others pls specify					
Your regular client type (RC)	Public [1]	☐	Private [2]	☐	Quasi -Public [3]	☐
Nature of your company (Comp)	Client [1]	☐	Consultant [2]	☐	Main contractor [3]	☐
	Builders work subcontractor [4]	☐	Supplier [5]	☐	E& M Sub-contractor [6]	☐

S.no	Questions	Survey Scale: 1=Strongly Disagree, 2=Disagree, 3=neutral 4=Agree, 5=Strongly Agree

A	**FOREMAN OR LABOUR**		1	2	3	4	5	
Q1	Does the policy make it clear that decisions on other goals will take due account of construction legal requirements?							
Q2	Is the strategy binding the company to completely comply with all relevant health and safety legislation?							
Q3	Does the policy set performance goals for health and safety including a commitment to social improvement?							
Q4	Was the Framework defining key senior staff for overall policy planning and implementation?							
Q5	Was the policy clarified to new hires before they join and work on site as part of their preparation and orientation?							
Q6	Are there appropriate efforts to update health and safety policies at least once a year?							
Q7	Is there a procedure whereby professional and experienced supervisors are acquainted with project management personnel, company policies and other safety concerns unique to the project?							
Q8	Are the revisions immediately brought to the attention of all workers where necessary?							
B	**SAFETY ORGANIZATION**		1	2	3	4	5	
Q9	Is there an operational chart displaying the names and roles with responsibility for controlling protection efficiency?							
Q10	Are there plans to receive and review health and safety reviews?							
Q11	Focus on providing appropriate qualified security officers and safety managers named and engaged for the site?							
Q12	Site administrators and supervisors are able to frequently communicate with operators in health talks?							
Q13	Are site-specific safety plans provided by subcontractors?							
Q14	Does the project have a formal monitoring system for behaviour?							
Q15	Is someone responsible for updating health and safety including policy amendments, updated codes of conduct, newly found hazards and modern work practices?							
C	**SAFETY TRAINING**		1	2	3	4	5	
Q16	Is there a training programme on health and safety, which is periodically reviewed?							
Q17	Have all employees received basic safety training in general?							
Q18	Have all the staff received health training unique to the site?							
Q19	Have all the staff received instruction in the toolbox on their tasks?							
Q20	Is health preparation a mandatory or line item within the budget?							
Q21	Is there a COMPUTER BASED TRAINING CBT within the organization that enables the systematic testing of the acquired skills by randomly choosing tests from a database?							
Q22	Is there any employee qualified in first aid on-site in a supervisory position?							
Q23	Is the protection content taught appropriate for trainers?							
Q24	Do administrative and supervisory staff undergo summary guidance on behaviour?							
Q25	Were tests of health expectations carried out on the initiative?							
Q26	Are applicable specialized training programmes for environmental laws, electrical operations, restricted space access, trenching, asbestos mitigation, lead elimination, back injury prevention, fall defence, shooting, fire security, misuse of explosives, traffic management, crane health & rigging and other protective equipment?							
Q27	Is health and safety training successful supervised by testing new skills?							
Q28	Was every worker issued with the protection booklet or short manual when entering the business?							
Q29	Does the policy set performance goals for health and safety including a commitment to social improvement?							
Q30	Was the policy clarified to new hires before they join and work on site as part of their preparation and orientation?							
Q31	Are there appropriate efforts to update health and safety policies at least once a year?							
Q32	Will the review scheme provide input from workers at all levels?							

Q33	Is there a procedure whereby professional and experienced supervisors are acquainted with project management personnel, company policies and other safety concerns unique to the project?							
D	**INSPECTING HAZARDOUS CONDITIONS**		1	2	3	4	5	
Q34	Do police staff and compliance management regularly carry out health checks?							
Q35	Are there appropriate procedures to ensure that action is taken regardless of the health inspection findings?							
Q36	Are there correct provisions for recording and reviewing health test reports?							
Q37	Have the regulatory specifications for the procurement of personal protection equipment been set out in the Safety Program?							
E	**PERSONAL PROTECTION PROGRAM**		1	2	3	4	5	
Q38	Has obtained appropriate stock of carefully chosen and suitable PPE?							
Q39	Has an appropriate framework been developed for the issuance, documentation and review of PPE and its replacement?							
Q40	Are there protocols for ensuring the correct usage of PPE, teaching and guidance in this field?							
Q41	Is there a procedure to monitor the PPE brought on-site by subcontractors or workers?							
Q42	Is any employee well conscious of the marking of all substances that are expected to be on site?							
G	**SAFETY PROMOTION**		1	2	3	4	5	
Q43	Are safety bulletin boards established and placed to see every employee on working days?							
Q44	Are Indian incident reports transmitted or shown?							
Q45	Are health notices and banners posted prominently on site?							
Q46	Is the company issuing a journal or publication that includes building specific health and safety materials?							
Q47	Are protection certificates annually presented to people for strong safety results?							
H	**MANAGEMENT BEHAVIOUR**		1	2	3	4	5	
Q48	Are location administrators and superiors participating in daily health meetings with employees?							
Q49	Any meetings pre-task before conducting an activity?							
Q50	Will all subcontractor workers follow specific health protocols?							
Q51	Do the subcontractors have daily discussions on health?							
Q52	Is the number of near-misses analysed to help prevent incidents?							
Q53	Is there any activity running in which contractor and sub -contractor gives no importance to safety for personal benefits							
Q54	No. of accidents happened during the year 2019							

VI. CONCLUSION AND RECOMMENDATION

The findings of this analysis give good analytical evidence for the theoretical model that strongly integrates context knowledge and components of safety efficiency. The research showed the relevance and durability of the nine common patterns of protection monitoring and safety behavior. In each of the 11 groups of organizations the predictive ability of the nine safety management practices on safety behavior was studied. Regulation of safety rules and procedures (SR) has been established as the main indicator among all 11 categories. In non-certified organizations, health management programs (SPs) have been shown to be relatively poor when the incident risk is considerably high. This testifies to the unsuccessfulness of conventional health prevention approaches addressing short-term gains. Security promotion policies (SPs) should not be stand-alone, but should be combined with high performing protection prevention systems such as security preparation, security coordination, safety laws and procedures, health participation of staff, prevention interaction etc. the results provide useful guidelines for researchers and clinicians to recognize the mechanisms by which they can improve occupational health. It should also be remembered that this study was conducted in an unstudied Indian population which is a developing country. The concrete findings indicate that understanding of workers and safety goals in India are reasonably good, opening up opportunities for more safety research.

The use of new technologies such as safe load indicator (in order to determine safe operating conditions), an anemometer (wind sensor) should be used, safety officer should be appointed who have much experience, shock absorber should be used.

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