A Review on Critical Success Factors for Safety Program Implementation in High Rise Building Construction

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Abstract— This review paper focuses on the determination of the major safety factors that governed the success of a safety management system for construction sites. Construction activity in India has made considerable development in the past two decades in the account with increase in development activities, government policies, and public demand. At the same time safety issues have become a major concern to construction organizations. Safety management on construction sites had always been a major issue in the construction industry of India. Particularly for Surat city where currently 547 construction project are ongoing and construction companies in Surat have tried to control the rising costs of accidents and reduce projects delays due to the accidents; however, they do not know why the safety programs do not work efficiently, or where to start. This situation suggested the need for the present study, which is aimed to identify the major factors affecting the implementation of safety programs in high rise building construction. Outcomes from this study will provide a set of critical factors that can be used to guide a successful construction safety program implementation as well as safety policy development in the construction industry in Surat. The factors affecting the success of activities and projects, often named critical success factors (CSFs) can be defined as "areas in which results, if they are satisfactory, will ensure success within and of the organisation".

Key words: Safety factors, Safety Programs, Construction Projects, and Success

I. INTRODUCTION

Construction industry plays a fundamental role in increasing the economy of many countries. It provides the infrastructure required for other parts of the economy to grow, thus reflecting the level of economic development of the countries. However, it is also documented that the construction industry has the highest rate of accidents among all industries as well as the highest rate of disabling injuries and fatalities.

Construction industry is considered as one of the most hazardous industrial sectors wherein the construction is more liable to worker accidents. Despite of recent development to improve safety on construction site, it still accounts for a disproportionate number of occupants-related fatalities. In developed countries, there is strict legal enforcement of safety in the construction industry and also in the implementation of safety management systems which are designed to minimize or eliminate accidents at work places. However, occupational safety in the construction industry is very poor in developing countries because lack of safety regulations and standards, low priority of safety, lack of data on safety at construction sites, lack of safety training, and lack of document.

II. NEED OF STUDY

Construction industry is both economically and socially important. The safety record in the construction industry continues to be one of the poorest. Research shows that major causes of accidents are related to unique nature of the industry, human behavior, difficult work site conditions, and poor safety management, which result in unsafe work methods, equipment and procedures. The emphasis in both developing and developed countries needs to be placed on training and the utilization of comprehensive safety programs. It is well known that construction projects have many work-related accidents and injuries. In recent years, to overcome such safety problems, safety program implementation has been given significant consideration as one of the effective methods. In order to effectively gain from safety programs, factors that affect its implementation need to be studied. Hence, this study tries to identify such major factors of safety programs.

III. FACTORS FOR SUCCESSFUL SAFETY PROGRAM IMPLEMENTATION IN HIGH RISE BUILDING CONSTRUCTION

SR NO.	FACTORS	DESCRIPTION
A	Worker Participation	
A1	Personal Attitude	Better Safety Attitudes Mean Better Perception Of The Work Atmosphere That Leads To Better Safety Performance
A2	Personal Motivation	To Improve Safety Performance At The Project, Formal Safety Meeting Must Be Held Regularly To Review The Safety Records.
A3	Employee Experience	Injuries Are Less In Experience Employee Compare To New Employee
A4	Employees Language/ Communication Barriers	Communication Allows People, Tasks, Processes And Systems To Interact Purposively And Co-Operatively To Achieve Health, Safety And Environment (HSE)Objectives.
A5	Employee Age	Most Studies Suggest That Injuries Are Less Frequent But More Severe Among Older Construction Workers
B	Safety Prevention & Control System	

B1	Safety Management System	Management Must Show That They Have Taken Active Steps To Implement Sound OSH Management System, Including Proper Risk Assessments, Reporting Systems, Safety Plan, Clear Delegation Of Responsibilities, Provide Adequate Resources And Ensure That Full Information Is Disseminated To Workers And Other Person Exposed To Risks.
B2	Safety Training	Training Programs Put In Place To Develop Employees' Knowledge And Skills On Safety At Work That Leads To Improving Their Safety Behaviours And Attitudes.
B3	Equipment And Maintenance	Regular Maintenance Of Equipment To Ensure That They Are Always In Safe Working Condition
B4	Personal Competency	Ability Of Individual To Carry Out The Right Thing At The Right Time By Using His/Her Sense, Experience And Skills To Evaluate The Hazard Conditions And Make A Proper Decision.
B5	Program Evaluation	A Safety Program Must Be Monitored And Reviewed To Make Sure That The Safety Goals Are Met.
C	Safety Arrangement	
C1	Communication	Effective Communications Is An Essential Consideration To Safe And Efficient Workplace. Leaders Convey Vision And Values Through Interaction And Communication (Ismail, 2007) And Effective Communication Leads To Commonly Understood Goals And Mean To Achieve Them At All Level.
C2	Allocation Of Authority And Responsibility	Appropriate Authority And Responsibility Assigned To Workers In Order To Deal With Safety Incidents And Carry Out Appropriate Actions.
C3	Adequate Resource Allocation	Sufficient Resources (E.G. Staff, Time, Money, Information, Facilities, Tools, Machines) To Carry Out Day-To-Day Activities To Accomplish Both Short-Term And Long-Term Goals.
C4	Safety Engineer On Site	If The Safety Engineer Is Not Present At The Site, There Is High Risk Of Accident On Site Because Safety Engineer Give Command To Working In Safe Environment.
C5	Management Rules And Regulation	Management Rules And Regulation Can Reduce The Risk Of Accident On Site.
C6	Safety Inspection	Safety Inspections Are One Means By Which Project Managers And Site Supervisors Can Become Acquainted With The Nature Of The Safety Conditions On-Site. Jobsite Safety Inspections By The Forepersons Are Helpful In Terms Of Reducing Work Injuries.The Use Of Safety Inspections Has Been Shown To Have A Positive Effect On A Company's Loss Control Initiative. In Fact Companies Who Perform Safety Inspections Have Fewer Accidents Incidents Than Companies That Do Not Perform Inspections.
D	Organization Al Structure	
D1	Safety Policy	Set Clear Direction Establish Objectives & Processes Creates Awareness Among Employees.
D2	Involvement Of Top Management	Top Management Should Actively Lead The Organization Towards Achievement Of Organization Safety Goals By Showing That Organization Is Serious About Safety.
E	Relationship Factor	
E1	Interfaces With The Stakeholder	If There Is Any Lack Of RELATIONSHIP Between Both The Parties Will Create Misunderstanding.
E2	Internal Personal Relationships	It Affect Directly The Safety Program On Construction Site
E3	Relation Between Labour & Contractor	Good Relationship Result In Lower Rate Of Occurrence Of Accident On Site
F	Project Nature	
F1	Cost Of The Project	It Affect How Much You Pay For Safety Precaution
F2	Application Of New Technology In Construction	It Will Increase The Chance Of Acccident In Case Of Operating Without Proper Knowledge And Guidance Of New Machinery Or Technology
F3	Limited Working Area	If There Is Less Working Area Than The Chances Of Accident On Site Due To Storage Is Increasing
G	Role Of Government & Engineering Society	

G1	Issuing Safety Laws, Standards,Regulations &Legislations	Its Forced To Construction Companies To Adopt Some Safety Precaution Before Starting Any Activity Related To Constructions
G2	Penalty For Safety Mesasures	It Enhance The Company Policy To Work With Proper Adoption Of Safety Measures
H	Medical Facility	
H1	Availability Of Medical Advice	It Decreases The Chances Of Accident On Site
H2	Availability Of Adequate Facilities For First Aid Treatment	It's Help To Care Labour In Case Of Minor Injuries
H3	Conducting Periodically Random Drug Testing	It Suggest The Person Who Have Taken Alcohol Or Not

IV. CONCLUSION

Present study outlines the major factors affecting to safety program implementation in high rise building construction projects. Based on literature study and from interview of experts, twenty eight factors were identified under eight major groups. Further methodology is suggested to work out critical factors from available various techniques to identify most crucial factor which affect to the safety program implementation in high rise building construction.

REFERENCES

[1] Al Haadir and K. Panuwatwanich "Critical Success Factors For Safety Program Implementation Among Construction Companies In Saudi Arabia" Elsevier Procedia engineering doi:10.1016/j.proeng.2011.07.017
[2] Abudayyeh O, Fredericks T, Butt S and Shaar A (2006). "An Investigation Of Management's Commitment To Constructionsafety". International Journal of Project Management, 24(2), pp. 167-174
[3] C.Jothsna and R.Jegan "Factors Influencing Safety In Construction Project And Behavior Based Safety Management Approach" International Journal for Research in Applied Science & Engineering Technology (IJRASET), Volume 5 Issue III, March 2017.
[4] Charehzehi, Aref and Ahankoob Alireza. "Enhancement Of Safety Performance At Construction Site" International Journal of Advances in Engineering & Technology, ISSN: 2231-1963, Volume 5, Issue 1, November 2012, 303-312
[5] Jayeshkumar Pitroda, Pranav Patel, Dr. Rajiv Bhatt " Identification Of Factors Affecting Safety Performance On Construction Projects Gujarat" International Conference on: "Engineering: Issues, opportunities and Challenges for Development" Researchgate ISBN: 978-81- 929339-3-1 ,15 April 2016.
[6] Jaselskis, E. J., Anderson,S.D and Rusell J.S (1996). "Strategies To Achieving Excellence: Construction Safety Performance." ASCE Journal of Construction Engineering and Management 122(1): p61-70.
[7] Mohammed Imthathullah Khan, K. Suguna and P. N. Raghunath "A Study on Safety Management system in Construction Projects" International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 4, Issue 4, July 2015.
[8] Mohd. Aqleem Mir,Bibha Mahto "Site Safety And Planning For Building Construction" International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 02 Issue: 02 , May-2015 .
[9] Rii & Impi: Effective Techniques For Finding Delay In Construction Project International Research Journal of Engineering and Technology (IRJET) Volume: 03 Issue: 01 | Jan-2016.
[10] Sunku Venkata,Siva Rajaprasad "Factors Influencing Implementation Of Ohsas 18001 In Indian Construction Organizations: Interpretive Structural Modeling Approach" Elsevier 30 April 2015.
[11] T. Subramani,R. Lordsonmillar "Safety Management Analysis In Construction Industry " Int. Journal of Engineering Research and Applications ISSN : 2248-9622, Vol. 4, Issue 6(Version 5), June 2014.
[12] Zubaidah Ismail,Samad Doostdar,Zakaria Harun "Factors Influencing The Implementation Of A Safety Management System For Construction Sites"Elsevier doi:10.1016/j.ssci.2011.10.001.

