

**ANALYSIE THE CULTURE IN THE WORKPLACE REGARDS  
TO THEMANAGEMENT OF SAFETY AND HEALTH FOR  
CONSTRUCTION WORK ENVIRONMENT**

**S. Binil Sundar\***

**Abstract**

Construction Sector is very essential and an integral part of infrastructure development which gives tremendous boost to our country's economy. The construction industry has registered enormous growth worldwide in recent years. Safety plays vital role in the construction sectors which are widely used in the above sector. This project discuss about safety culture and safety climate. Safety Culture is the enduring value and priority placed on workers and public safety by everyone in every group at every level of an organization. Safety climate is a theoretical term used by safety and personnel professionals to describe the sum of employee perceptions regarding overall safety within the workplace.. The methodology is briefly explained which includes various steps such as review of literature, data collection, SPSS software study, result analysis and developing model for Safety Culture. A questionnaire is prepared based on many criteria such as accidents, safety in emergency period, safety information, workplace hazards, workplace risks, workplace health & safety, welfare and time regulations and finally about review. The Questionnaire prepared is circulated to many construction companies. Data are primarily collected to provide information regarding a specific topic. The purpose of data collection is to obtain information to keep on record, to make decisions about important issues, or to pass information on to others. SPSS software study is done. SPSS is a software package used for statistical analysis. Here descriptive statistics which includes Cross tabulation, Frequencies, Explore and Descriptive Ratio Statistics are done using the SPSS software and results are obtained. The results for the

**\* Asst Professor (SG) – Civil Engineering Department, Saveetha School of Engineering, Saveetha University, Chennai, India.**

analysis are graphically represented in pie charts and bar charts for various criteria classified in questionnaire. The final conclusion is arrived based on the results and the model of safety culture for construction industries in Chennai has been developed **Keywords:** safety culture, safety climate, SPSS, descriptive statistics

## INTRODUCTION

### 1.1 GENERAL

Construction Sector is very essential and an integral part of infrastructure development which gives tremendous boost to our country's economy. The construction industry has registered enormous growth worldwide in recent years. Although the development of technology is rapid in most of the sectors, construction work is still labour intensive. In India the construction sector employs around 33 million people, which is next to agriculture. Construction is unique compared to other industries. It has been repeatedly stated that each Construction project is different from another by presenting different situations and problems during its execution. Planning and execution under time and budget pressures, temporary workers with various skills, and works influenced by weather conditions and external environments are some characteristics that differs construction projects from projects in other industries. These characteristics make construction projects face hazardous conditions that are potential to cause accidents. Traditionally, safety in construction is the primary responsibility of general contractors and subcontractors, and not designers and construction managers.

### 1.2 SAFETY CULTURE

Safety culture is the ways in which safety is managed in the workplace, and often reflects "the attitudes, beliefs, perceptions and values that employees share in relation to safety". Safety Culture is the enduring value and priority placed on workers and public safety by everyone in every group at every level of an organization.

### 1.3 SAFETY CLIMATE

Safety climate is a theoretical term used by safety and personnel professionals to describe the sum of employee perceptions regarding overall safety within the workplace.

#### 1.4 KEY DIFFERENCES CULTURE VS CLIMATE

Safety Culture is commonly viewed as an enduring characteristic. Safety Culture is the attitudes, values, norms, and beliefs that a particular group of people share with respect to risk and safety. Safety Culture is a group of individuals guided in their behavior by their joint belief in the importance of safety. Safety Cultures build joint responsibility between individuals from management to employee.

#### 1.5.3 Formal Safety System

This refers to the processes for reporting and addressing both occupational and process safety hazards. These systems include

- Reporting systems
- Feedback and response
- Safety personnel

#### 1.5.4 Informal Safety Systems

This refers to the unwritten rules pertaining to safety behavior including rewards and punishments for safe and unsafe actions. These systems include:

- Accountability
- Authority and Employee professionalism

#### 1.6 OBJECTIVE

- To examine the current culture in the workplace regarding the management of safety and health.
- To create a safe working environment for the construction companies in Chennai.

#### 1.7 SCOPE

- To maintain a safe working environment.
- To minimize our environmental impact.
- To promote a culture of responsibility for our environment, health, and safety.

- To continually improve our environment, health, and safety management systems.
- To prevent significant damage to property other than that of the company.

## REVIEW OF LITERATURE

The main purpose of literature review is to give an idea about the work conducted world over in the field of study. In this a brief review of literature about the safety culture and model is reported and other safety measure is also reported.

## LITERATURE

**M. D. Cooper (2000)** describes Organizational culture is a concept often used to describe shared corporate values that affect and influence members' attitudes and behaviors. Safety culture is a sub-facet of organizational culture, which is thought to affect members' attitudes and behavior in relation to an organization's ongoing health & safety performance. However, the myriad of definitions of organizational 'culture' and 'safety culture' that abound in both the management and safety literature suggests that the concept of business-specific cultures is not clear-cut. Placing such 'culture' constructs into a goal-setting paradigm appears to provide greater clarity than has hitherto been the case. Moreover, as yet there is no universally accepted model with which to formulate testable hypotheses that take into account antecedents, behavior(s) and consequence(s). A reciprocal model of safety culture drawn from Social Cognitive Theory (Bandura, 1986) is offered so as to provide both a theoretical and practical framework with which to measure and analyse safety culture. Implications for future research to establish the model's utility and validity are addressed.

**Cooper M.D (2003)** describes Analyses of a construction related Risk Perception Questionnaire (n=194) and ten distributions of a Safety Climate questionnaire, sampling a total population of 1325 personnel from three industrial sectors (Manufacturing, Chemicals and Foods) consistently revealed statistically significant differences between occupational groupings in their perceptions of risk. Multiple regression analyses provided insights into the organizational, job and individual biasing factors that appear to determine each group's 'frame of reference' when evaluating workplace risks, suggesting possible explanations for differences

between the groups which are of both theoretical and practical importance.

**Dr.Dominic Cooper et al (2005)** describes that one of the major aims of conducting a safety culture survey is to identify deficiencies in the organizations safety management systems, working conditions, and safety-related behaviors. Once identified it is incumbent upon personnel to implement the appropriate remedial actions. This will involve setting performance targets. Although this sounds simple, there are a number of important process features, which help to ensure that a target will be met. The targets need to be clearly and precisely defined. A clear, specific target also helps to ensure that the target is measurable. A measurable target is vitally important if people are to track their progress towards the target's achievement. However, a target will not be met unless people are committed to achieving it.

**Dr.Dominic Cooper et al (2007)** describes Perceptions and beliefs, behavior and management systems are the elements which combine to form an organisation's safety culture. Dr.Dominic Cooper considers their significance to achieving the goal of good safety management.

**ThanwadeeChinda (2007)** describes the developed construction safety culture dynamic model provides insight into the interactions and influences that each enabler has on improving construction safety culture over time. The construction safety culture index helps an organization to assess how well its safety implementation is performed, and provides guidance on how to plan for safety improvements.

**Andi (2008)** describes efforts to reduce construction accidents can be initiated by building good safety culture. Researches concerning safety culture, however, are still limited. This research aims to empirically gauge worker's perception toward safety culture in construction projects. Data were obtained through questionnaire survey to three large construction projects. Data were obtained through questionnaire were gathered and used for subsequent analyses. Results show that in general worker's perception towards safety culture is quite good. Further analysis that worker in the three projects have different safety culture perceptions, especially on factors of top management commitment, safety rules and procedures, communication and worker's competency.

## METHODOLOGY

The methodology is for developing a safety culture model for construction industries in Chennai.

The detailed methodology can be explained as follows:

- Data collection
- Questionnaire survey
- Analysis using SPSS Software
- Safety Culture Model Preparation

### 3.1.1 Data Collection

Data collection is any process of preparing and collecting data, for example, as part of a process improvement or similar project. The purpose of data collection is to obtain information to keep on record, to make decisions about important issues, or to pass information on to others. Data are primarily collected to provide information regarding a specific topic. Data collection usually takes place early on in an improvement project, and is often formalized through a data collection plan which often contains the following activity.

- Pre collection activity- agree on goals, target data, definitions, methods.
- Collection - data collection.
- Present Findings - usually involves some form of sorting analysis and/or presentation.

### 3.1.2 Questionnaire

A questionnaire is a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents. The Questionnaire is prepared based on the criteria such as Accidents, Safety Policies, Fire Precautions and Emergency Evacuation, Information, Instruction, Supervision, Training and Consultation, Workplace Hazards, Workplace Risks, Workplace Health & Safety, Welfare & Working Time Regulations, Review

## CHAPTER 4

## RESULTS AND DISCUSSIONS

The results of the statistical analysis and the discussion on those results dealt in this chapter. A model for the evaluation of the safety management system in construction industry was formulated based on the results obtained from the questionnaire survey and structural interviews. One of the objectives of the research is to evaluate the effectiveness of safety management system in construction industry. The objective has been achieved based on the investigation through questionnaire survey, analysis results based on safety practices in construction industry was developed. Finally the chapter offers direction for future research to continue in the context of Indian construction industry.

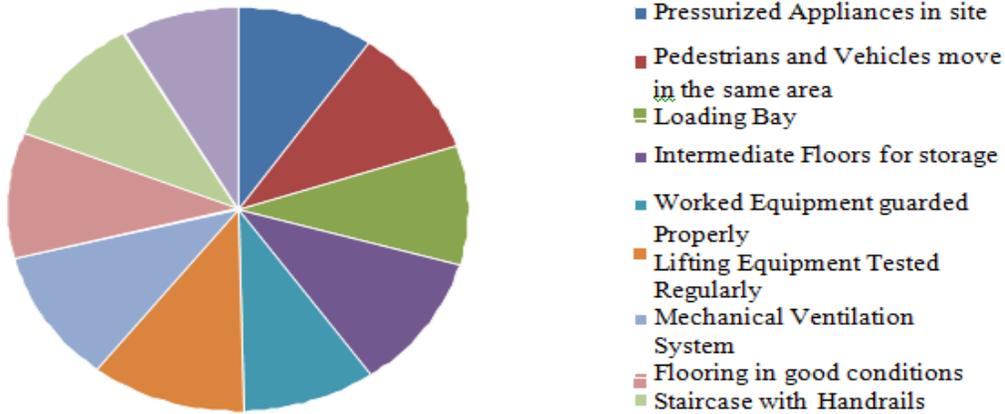
## 4.3.4 Workplace Hazards

The majority of construction industry does not conduct safety training for the workers in the site and company safety notice has not been displayed in the site. Therefore hazards happen.

Table 4.5 Cross tabulation result for Workplace Hazards

Questionnaire	Yes	No
Pressurized Appliances in site	38	12
Pedestrians and Vehicles move in the Same area	33	17
Intermediate Floors for storage	38	12
Worked Equipment guarded properly	30	20
Lifting Equipment Tested regularly	40	10
Mechanical Ventilation System	30	20
Flooring in good Condition	32	18
Staircase with Handrails	35	15
Staircases, Walkways and Fire Exit	32	18
	46	4

The pie chart is drawn to find the main key factors in this set of questionnaire and using this main key factors the cross tab is done in the above table.



**Fig. 4.4 Factors relating to workplace hazards**

The figure 4.4 represent the 11.59% of the construction industry has safety measures for the above mentioned constraints in the work site.

**Table 4.1 Cont...**

Questionnaire	N	Minimum	Maximum	Mean	Std. Deviation
H&S Policy in Place	50	1	2	1.47	0.507
Policy Effective	50	1	2	1.30	0.466
H&S Training for Employees	50	1	2	1.27	0.450
Records of H&S Training	50	1	2	1.47	0.507
Workrooms Ventilation Maintained	50	1	2	1.30	0.466
Workrooms Temperature Maintained	50	1	2	1.40	0.498
Sufficient Lighting Provided	50	1	2	1.33	0.479
Workplace Cleanness Maintained	50	1	2	1.43	0.504
Waste Stored in bins cleared daily	50	1	2	1.43	0.504
Workstation Comfortable	50	1	2	1.30	0.466
Computer Usage at least 2 hours	50	1	2	1.43	0.504
Work equipment Movement	50	1	2	1.10	0.305

The Table 4.1 shows the values of descriptive statistics which includes minimum, maximum, mean and standard deviation. The tabulation includes results for the entire questionnaire.

#### 4.3.6 Workplace Health & Safety

The majority of construction industry does not maintain the workplace clean, stores the waste in bin properly, do not provide for insurance for workers and machinery.

**Table 4.2 Cross tabulation result for Workplace Health & Safety**

Questionnaire	Yes	No
Sufficient Lighting	37	13
Workplace Clean	30	20
Waste Stored in bins	32	18
Workstation Comfortable	33	17
Computer Usage at least 2hours	28	12
Insurance Cover	37	13
Insurance policy for employees	37	13
Work equipment Movement by employee	27	23
Storage of harmful materials	45	5
Asbestos	37	13

#### 4.3.3 Safety Information

The safety information includes safety instruction, safety supervision, safety training and safety consultation. All these together come under safety information.

Questionnaire	Yes	No
Company Reviews & Updates	33	17
Process of Risk Assessment	40	10
Safe Systems of Work	32	18
System for Maintaining Plant	41	9
Health & Safety Induction Training	35	5
Refresher of Health & Safety	46	4
Employees Consultation about H&S Training	30	20
Any dangerous Machinery System	40	10
Written H&S information provided	33	17
Poster on Injury Management	41	9

Table 4.3 Cross tabulation result for Safety Information

The pie chart is drawn to find the main key factors in this set of questionnaire and using this main key factors the cross tab is done and shown above table.

#### 4.3.7 Welfare & Working Time Regulations

The majority of construction industry does not provide proper clean restroom, any kind of refreshment, drinking water.

Table 4.7.1 Cross tabulation result for Welfare & Time Regulations

Questionnaire	Yes	No
Work Time Regulation	27	23
Restrooms	28	12
Drinking Water	25	25
Hot Drink (Tea/Coffee)	28	12
Provision for Pregnant Women	32	18
Stress Risk Assessment	30	20
In charge person of H&S	28	12
Employees Awareness	27	23
Employees involvement in H&S	41	9
Organization Face	35	15

The pie chart is drawn to find the main key factors in this set of questionnaire and using this main key factors the cross tab is done in the above table.



**Fig. 4.4 Factors relating to workplace hazards category**

The figure 4.7 represent the 11.74% of the construction industry has safety measures for the above mentioned constraints in the work site.

#### 4.3.8 Review & Conclusion

The review includes workrooms ventilation, workrooms temperature, H&S policy in place, safety policy effective, waste Stored in bins cleared daily and Computer Usage.

#### Table 4.5 Cross tabulation result for Review

Questionnaire	Yes	No
H&S Policy in Place	27	23
Policy Effective	35	15
H&S Training for Employees	27	23
Records of H&S Training	27	23
Workrooms Ventilation Maintained	35	15
Workrooms Temperature Maintained	30	20
Sufficient Lighting Provided	33	17
Workplace Cleanness Maintained	28	12
Waste Stored in bins cleared daily	28	12
Workstation Comfortable	35	15
Computer Usage at least 2hours	28	12

The pie chart is drawn to find the main key factors in this set of questionnaire and using this main key factors the cross tab is done in the above table.

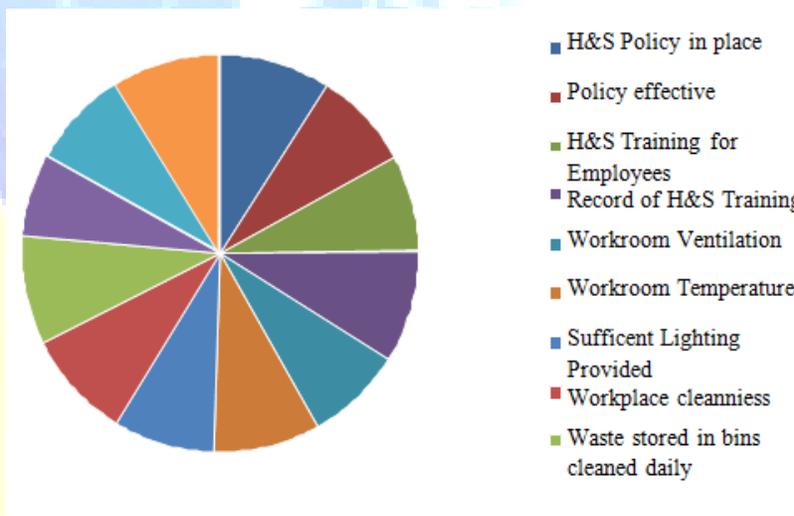


Fig. 4.6 Factors relating to result for Review

The figure 4.6 represent the 13.10% of the construction industry has safety measures for the above mentioned constraints in the work site.

The main conclusions drawn from the project are given below with respect to the following factors.

- i. In **accidents** only 14.1% of construction industry maintains safety first aid kit and others doesn't due to
  - ❖ The safety practices are not followed by the construction companies.
  - ❖ Funding for the safety measures is not sufficient.
  - ❖ Lack of improving the standards of work in systematic manner.
- ii. In **safety in emergency period** only 12.1% of construction industry maintains precautionary measures
  - ❖ Safety policies of the companies are not displayed.
  - ❖ Fire precautions should be taken before the accidents
  - ❖ Emergency evacuation is not done.
- iii. In **safety information** only 12.4% of construction industry maintains precautionary measures
  - ❖ Process of Risk Assessment should be done.
  - ❖ Written H&S information should be displayed.
  - ❖ Refresher training for workers to be done.
- iv. In **Workplace Hazards** only 11.59% of construction industry maintains precautionary measures
  - ❖ Mechanical Ventilation should be provided.
  - ❖ Handrails to the staircases to be provided.
  - ❖ Lifting equipment such as cranes lift are to be tested and serviced regularly.

## REFERENCES

- [1] Abdelhamid, T.S. and Everett, J.G., 'Identifying Root Causes of Construction Accidents', *Journal of Construction Engineering and Management*, ASCE, 126 (1), pp. 52–60. (2000),
- [2] Abudayyeh, O. et al., 'Analysis of Occupational Injuries and Fatalities in Electrical Contracting Industry', *Journal of Construction Engineering and Management*, 129(2), pp. 152–158. (2003).
- [3] Ahmed, S.M., Kwan, J.C., Ming, F.Y.W. and Ho, D.C.P., 'Site-Safety Management in Hong Kong', *Journal of Management in Engineering*, ASCE, 16(6), pp. 34–42. (2000).
- [4] Andi, *Construction Workers Perceptions Toward Safety Culture* (2008)
- [5] Bird, F. and Loftus, R., *Loss Control Management*, Loganville, Ga: Institute Press, (2006).
- [6] Chris Hendrickson., 'Project Management for Construction', *Fundamental Concepts for Owners, Engineers, Architects and Builders*, Prentice Hall Pittsburgh. (2000).
- [7] Chew, Y.S., and Chai, LN., 'ISO-9002 in Malaysian Construction
- [8] Cooper, M.D., 'Improving Safety Culture: A Practical Guide', Wiley, Chichester. (2003).
- [9] Cooper, M.D 'Evidence from Safety Culture that Risk Perception is culturally determined', *The International Journal of Project & Business Risk Management*, Vol 1(2), 185- 202. (2007).
- [10] Darryl C. Hil, 'Construction Safety Management and Engineering', *Journal of SH&E Research– American society of Safety Engineers*, Vol 1 Pg No.717. (2004).
- [11] Dominic Cooper C.Psychol, 'Measuring and Improving Safety Culture' *The ESH*

Handbook for the Public Sector , (2005).

[12] Glendon. A. I. and N. A. Stanton, 'Perspectives on safety culture', Safety Science 34 215±2561, (2002).

[13] Guldenmund. F.W 'The nature of safety culture: a review of theory and research. Safety Science', Pg No. 215 – 257, (2000).

[14] Laurence. D ,Safety rules and regulations on mine sites—the problem and a solution', Journal of Safety Research, Vol 1 , Pg No.39 – 50. (2005).

[15] Sesé. A, A. L. Palmer 'Occupational safety and health in Spain' Journal of Safety Research, Vol 4 , Pg No.511 – 525. (2002).

[16] Steven Yule, 'Safety culture and safety climate: A review of the literature' Industrial Psychology Research Centre, University of Aberdeen, UK. (2004).