Analysis of Safety Management System in the Construction Industries

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Abstract— In a high-risk industries like construction, safety is an asset that delivers actual benefits. A safe work environment help to keep expert employees on the job and projects on track by reducing misfortunes that result in injuries and schedule delays, while also sinking the risks of proceedings and regulatory action. This project discuss about safety culture, safety practices and their implementation in a construction site. The objective of this project is to study the current working conditions and examine the problems in the workplace regards to the management of safety and health and create a safe working environment at the construction site. A questionnaire is and circulated to the construction firms all over tamilnadu. The questionnaire is prepared based on the criteria such as accidents, emergency period, safety performance, workplace hazard and risks, health & safety, management commitment. The purpose of data collection is to obtain information and maintain record, to make decisions about important issues, or to pass information on to others. The study of this paper helps to know about the current work practices at construction site.

Keywords—safety culture, workplace hazards, questionnaire, construction firms, injuries, health and safety.

I. INTRODUCTION

Culturally, construction residues an industry where personnel may feel that taking risks is a part of the job and may disquiet about what their dukes think of those who take extra precautions. The reality is that construction workers are more uncovered to workplace injuries because of the intrinsic dangers of a job that often involves operational with large machinery and power tools, commonly many floors above the ground. The major causes of accidents are associated to the exclusive nature of the industry, human behavior, problematic work site conditions and humble safety management which results in insecure work methods, equipments and procedures. Preventing work-related complaint and injuries should be a chief anxiety of all employers.

By concentrating on excluding dangers at the construction site through the tactics that engraves safety and health, construction administrators can embrace and stimulate a safety attitude throughout their organization. This approach adapts the traditional enforcement mentality, which immediately intimidates workforces who violate standard shelter rules with disciplinary action. This individual-based safety philosophy follows the principle that if organizations are reminded, on a day-to-day basis, of the influence that an grievance can have on their domestic life and private affairs they will be more likely to work carefully and avoid threats that could result in accidents. A positive safety culture supports to save life of humans, reduce entitlements and interruptions, and boost up productivity and provide success to the organizations.

II. SCOPE OF THE PROJECT

- With large scale broaden construction movement in recent years, safety become necessary to adopt measures for minimize the likelihood of accidents in this nation wide business.
- This study provides information about various tasks performed in the construction industry and also explain the safety practices adopted by the industries.
- It becomes necessary to consider certain safety measures and program to prevent accidents and injuries at site.
This study helps to shaping human resources beliefs and attitudes that lead to safe behavior and ultimately to a strong safety culture.

III. OBJECTIVES

- To study the recent operational functions and safety enactment in the construction industries.
- To detect the source of construction safety difficulties.
- To create consciousness and recover site security in the construction industries.

IV. LITERATURE REVIEW

Andrew Hale and David Borys (2015) - The main focus of this paper is on occupational safety and health regulations, but a few examples from connected areas such as environmental regulation are also included. The main concepts developed and discussed could be applied to safety regulation. The factors include political climate, the safety culture, legislative civilization and structures, the role of insurance etc. They have focused on analyzing the problem of regulation and its burdens and offered some suggestions of ways to reduce regulatory burdens.

Heng Li, Miaojia Lu, Shu-Chien Hsu, Matthew Gray, Ting Huang (2015) - The purpose of their research is to identify worker behavior as the root cause of construction accidents. They proposed the theory called Behavior-based safety (BBS) is one valuable approach in supervising employee safety issues. The implementation of PBBS management, strong safety awareness attitudes can be instilled in workers, who can then expand habitual thinking of safe ways to perform all construction activities. PBBS management also has the potential for global use as does the improved vision of BBS, which is tailored to the construction industry.

Patrick L. Yorio, Dana R. Willmer and Susan M. Moore (2015) - These nuances highlight the types of biases that can arise when choosing a level of dimension to assess the HSMS and techniques that can be used to minimize measurement error and increase the validity of inferences made. The contingencies are discussed from a theoretical perspective and presented in this paper. The potential benefits of these arguments, and the corresponding conceptual model presented, include stronger H&S theory growth opportunities and a broader range of hypotheses that can be generated in this study.

Rafiq M. Choudhry, Dongping Fang and Syed M. Ahmed Safety (2008)-This paper describes an exploratory study of site safety executive in construction site environments. It explains a successful, modern safety, health and environmental management system for a chief construction company based in Hong Kong. The findings of the survey provide practical information to construction project manager and construction safety practitioners. The information obtained from this study might be useful to many construction company, particularly for companies in developing countries where construction safety awareness is not high.

Xinyu Huang and Jimmie Hinze (2006)-This paper will present the results of a study on the owner’s role in construction safety. Statistics were obtained by conducting interview on bulky construction projects. The connection between project safety concert and the owner’s authority was examined, with particular focus on project characteristics, the selection of safe contractor, contractual safety necessities, and the owner’s participation in safety management during project execution. Throughout analysis of the project interview data, it can be concluded that owners can positively manipulate project safety presentations.
III. METHODOLOGY
The projected methodology of this paper is significantly represented through the flow chart.

![Methodology Flow Chart]

IV. PROBLEM IDENTIFICATION
These factors were recognized based on personal scrutiny and literature study. Recognizing the significant key points such as climate, culture, attitudes, and behavior. In appropriate of these key drivers generate more threats and danger in the building sector. The main keys include following points are given below.

- **Culture**
  - Leadership
  - Educational Training
  - Team work
  - Rights & Duties
  - Prevention planning

- **Climate**
  - Supervision & Guidance
  - Security
  - Work Pressure & Intensity
  - Personal Competency

- **Attitude**
  - Awareness
  - Job satisfaction
  - Clear Mind Set
  - Extraversion

- **Behavior**
  - Operation
  - Safety In High Levels & Hoisting Machines
  - Emergency Measures
  - PPE
  - Control system

V. QUESTIONNAIRE PREPARATION AND ANALYSIS
Questions can be prepared based on the general information about the site, the details of the safety policy and program, facilities availability in the site, record keeping, safety committee, hazard analysis, PPE usage at the site. The developed questionnaires were distributed to the large, medium and small companies based on their annual turnover. Questions form consist of both 5 point scale and 2 point scale (Yes & No) Questions. Nearly the questions given to 135 companies. On the whole 70% of responses can be arrived and analysed. Observations were made during the survey by direct interviews and through email. Interviews of project managers, contractors, site engineer and
labourers were taken for the purpose of the survey. The results are obtained by using SPSS (Statistical Package For The Social Science) software analysis.

VI. RESULTS AND DISCUSSION

The statistical analysis can be made in which mean value of all the factors that affect construction site safety vary between 2.33 to 3.20. These are the ten factors which affects the site safety. Among these amenities and facilities, management commitment, safety meeting, hazard analysis, emergency measures, workers attitude were ranked as top six factors that concern construction safety with standard mean of 2.93, 3.20 and 3.13, 2.80, 2.73 and 2.80 respectively. Results of Likert scaled questions in given below the table.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Factors Affecting Safety</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Amenities and facilities</td>
<td>2.93</td>
<td>0.92</td>
</tr>
<tr>
<td>2.</td>
<td>Management involvement</td>
<td>3.20</td>
<td>0.91</td>
</tr>
<tr>
<td>3.</td>
<td>Safety meeting</td>
<td>3.13</td>
<td>1.16</td>
</tr>
<tr>
<td>4.</td>
<td>Safety practices</td>
<td>2.47</td>
<td>1.30</td>
</tr>
<tr>
<td>5.</td>
<td>Emergency measures</td>
<td>2.73</td>
<td>1.10</td>
</tr>
<tr>
<td>6.</td>
<td>Communication</td>
<td>2.33</td>
<td>1.05</td>
</tr>
<tr>
<td>7.</td>
<td>Record keeping</td>
<td>2.29</td>
<td>0.88</td>
</tr>
<tr>
<td>8.</td>
<td>Workers attitude</td>
<td>2.80</td>
<td>1.01</td>
</tr>
<tr>
<td>9.</td>
<td>Leadership</td>
<td>2.33</td>
<td>0.90</td>
</tr>
<tr>
<td>10.</td>
<td>Hazard analysis</td>
<td>2.80</td>
<td>0.92</td>
</tr>
</tbody>
</table>

Table 1. Descriptive statistical analysis

VII. CONCLUSIONS

The work surroundings in construction events are usually more dangerous, than other sector due to the use of substantial equipment and tools, and insecure materials are result in many calamities and damages. Consequently, it is obvious that a safety is obligatory for each and every construction industries. To achieve safety the following recommendations are necessary in the industries. They are,

- Motivate the curiosity of employees and buildingworkforces in safety by conducting safety campaigns, safety competitions, consultations and movie shows regarding safety and other measures are taken wherever required.
- Walk around the construction site with a vision to check the insecure performs and detect the unsafe conditions and take corrective measures immediately.
- Carryout inspection and hazard analysis related touseage of explosives, chemicals and other materials and to suggest preventive measures including appropriate personal protective equipment.

Owners can energetically partake in the construction safety management in each stage of project performance including project design, contract selection, the construction phase, choosing safe contractors and developing the safety culture on the tasks through safety training and safety recognition programs.

REFERENCES


