Safety Practices in Construction Industry

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ABSTRACT

Construction industry has traditionally been recognized as one of the major economic forces that have contributed vastly in developing our nation and is the second largest industry in the Nation after agriculture and offers tremendous scope for growth anti-development of human resource. The unsatisfactory safety record of construction industry has always been hit since the safety management system is a neglected area and has not been pursued and implement systematically in the construction industry even though a number of Middle East Standards and labor Laws exist on Safety in Construction. This study is focused on identifying the current safety practices in construction industry. It is also gathered through structured interactions conducted with experienced personnel from construction field. A total of 130 respondents were requested out of which 86 responded. Responses on the aspects of safety implementation and management practiced by construction companies were based on ‘Yes’ and ‘No’ scale. Responses to the questions on safety levels of awareness, culture, implementation/standard, compliance, enforcement, monitoring and control, safety improvement measures and also investment in safety were based on Likert scale of three ordinal measures of agreement. The 86 responses were analyzed using frequency and relative index analysis. The survey shows a very good trend in basic safety practices but the commitment and concern towards safety training keeping work site free from drug & alcohol and handling of emergency situations is low. At an average 43% of the surveyed safety practices are followed in the construction industry. There is a strong need to implement the safety measure to improve safety at workplace. The respondents also tend to strongly agree that safety investment is a viable and worthy effort to improve the safety in construction industry. The software developed on the data base of 86 responses suggests the sate 110 practices which should be followed by the construction industry within certain &tin parameters.

INTRODUCTION

Construction industry has traditionally been recognized as one of the major economic forces that have contributed vastly in developing our nation and is the second largest industry in the Nation after agriculture and offers tremendous scope for growth and development of human resource. Despite employing 8-10% of industrial work force, construction accounted for 5-18% of all workplace deaths and 10-12% of disabling injuries. Throughout the world, it is one of the most hazardous industries- The major causes of accidents are related to the unique nature of industry, human behavior, difficult Work site conditions and Poor safety management, unsafe work methods, equipment and procedures. Unfortunately its reputation and image has been tarnished by high rates of accidents and fatalities incidences that have occurred on sites. Therefore, it is still being regarded as a highly risky and hazardous industry in the country. Certainly, there is a need to look into some ways and methods in improving its tarnished image.

The unsatisfactory safety record of construction industry has always been highlighted since the safety management system is a neglected area and has not been pursued and implemented systematically in the construction industry even though a number of Indian Standards and Labour Laws exist on Safety in Construction (Annexure and III refers). Safety at workplace is an issue affecting all businesses since most companies do not feel that it is vital to the success and are afraid all of possibility of prosecution.

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Although the construction industry involves a very complex process, it should emphasis on finding a management strategy and resolution in reducing the rate of accident occurrence and need to implement suitable safety practices.

Hinze and Harrison (1981), have identified that good safety program practiced in a big company can help to reduce the injury rate at construction site. The success of a big, company, in tackling safety aspects is due to the fact that safety competency certificate holders exist among its workers irrespective of any working level. So the follow the objective of this paper

1-To determine the current safety practices in the construction industry.
2-To investigate the levels of some key elements in safety practices in the construction industry.
3-To evolve some measures that can be adopted to improve the safety practices of the construction industry.
4-To recommend some of the best safety practices for the construction industry.
5-To develop software based on data collected to help contractor construction companies identify best safety practices for itself (within certain defined parameters).

**Research Methodology:**

The proposed research has been carried out as shown below at the flowchart.

**Step 1:**

Responses on the aspects of safety implementation and management practiced by construction companies were based on “Yes” and “No” scales responses to the questions on safety levels of awareness, culture, implementation/standard, compliance, enforcement, monitoring and control, safety improvement measures and also investment in safety were based on Likert scale of three ordinal measures of agreement as shown in below figure: -

**Fig. 1:** Likert scale of three ordinal measures of agreement

Each number on the scale carries the following rating:

1 = Disagree
2 = Agree
3 = strongly agree
Whereas the comparison of safety implementation/standard and compliance between the oil and Gas Construction Industry and construction Industry was based on a rating scale of 1 to 5 as below. This rating scale was developed based on rating scale implemented by Occupational safety and Health (OSH) in evaluating the OSH – MS construction sites

- Poor
- Satisfactory
- Good
- Very Good
- Excellent

**Step ii:**

In achieving the desired results and conclusions, the raw data collected from the questionnaires survey on the aspect of safety implementation and management practiced by construction companies (‘Yes’ or ‘no’ questions) were analyzing by percentage calculation whereas the frequency analysis and relative index (RI) were used in analyzing collected data from the responses regarding safety levels of awareness, culture, implementation/standard, compliance, enforcement, monitoring and control, safety improvement measures and also investment in safety.

The relative index (RI) was calculated by means of the following formula (Abd.Majid and Mc Caffer R23, 1997):

$$RI = \frac{\sum (1n_1 + 2n_2 + 3n_3)}{3(n_1 + n_2 + n_3)}$$

Where $N_x$ is the number of respondents agreeing with x choice (Holt et al24, 1996)

The computation of relative index using the formula yields the value ranging from points two to one, where point two represent minimum strength and one represents the maximum strength as follows:-

- Min. strength: $RI = 0.2$
- Max. strength $RI = 1.0$

The rating of the responses is grouped as follows:

- Disagree: $0.2 < RI < 0.4$
- Agree: $0.4 < RI < 0.7$
- Strongly agree: $0.7 < RI < 1.0$

**Step iii:**

Software has been developed as per under mentioned parameter and constraints for developing the software input selected was:-

- **Type of work (manpower intensive/machine intensive).** The type of work undertaken by contractor/construction Company can be buildings, Roads, Buildings and Roads, water supply and sewage system, Industrial Construction/ structural steel work or oil and Gas.
- **Class of the Company/Contractor.** The class can be SS or S A or B or C or D or E
- **Queries.** The queries identified were safety practices to be followed. Budget to be earmarked and Likelihood of accidents.
  - (i) Safety practice to be followed. For this query the input data was the percentages of budget allocation for safety and output required was to obtain safety practices to be followed and the likely accident rate.
  - (ii) Budget to be earmarked. For this query the input data was the acceptable level of accidents and output required was to obtain the budget needed and the safety practices to be followed.
  - (iii) Likelihood of accidents. For this query the input data was safety practice followed and/or budget allocated and output required was to obtain the likely rate of accidents per year.

The methodology for the study involves literature review, question building for questionnaire set, conduct of questionnaire survey and structured interaction with targeted respondents, analysis of data from the survey and interpretation of the findings that are streamlined to the fulfillment of the objectives of the thesis. The software developed based on data collected will suggest the best practices for a construction company based on its need with respect to given parameters and constraints.

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<th>Table</th>
<th>Respondents Distribution According to company’s class</th>
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<td>SS</td>
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<td>9</td>
<td>6</td>
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<td>10.4%</td>
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Table: Respondents Distribution According to company’s ISO certificates

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<td>73</td>
<td>86</td>
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Percentage of, No; Responses to construction safety practices

Result:
The case was analyzed as per parameters and constraints suggested by the contractor based on the software having a data base of 86 respondents to the questionnaire survey. The recommended safety budget is need based and the safety practices are as under:

- Have Safety Officer and a safety department.
- Have an overall safety plan and form safety committee.
- Conduct annual internal and external safety audits and management review.
- Conduct training of staff/workers on safety aspects and organize safety walk about.
- Demarcate the boundaries of red green zones.
- Emphasise on PPE.
- Emphasise on safety hazard analysis and identify hazards at work site.
- Provide fire extinguishers and place signboard at work site.
Conclusions:

The thesis is concluded to fulfill the objectives of the thesis which is to determine the best Practices that can be adapted to the construction industry as per specific need based on define Parameter. The conclusion derived from literature review, questionnaire survey and structured Interactions are as follows:

Based on the survey findings, none of the companies is certified for ISO14001:2004 and Only three are certified for OHSAS 18001:2007 and 10 are certified with ISO 9001:2008 Out of 86 companies. The survey indicates a very good trend in basic safety practices in Construction industry but also reflects very low commitment and concern on the Importance of handling emergency situations and having workers who are free from the Influence of drug and alcohol. Finally, only 43.33% of the surveyed safety practices are Being implemented in the industry. overall the survey respondents’ perceptions are in the ‘agree’ and ‘strongly agree’ categories for the levels of key elements surveyed whereas they perceived very good and only good level of overall safety practices in oil and gas and construction industries respectively. The structured interaction respondents have also given the similar ratings lastly, they have proposed full PPE compliance.

There is a very strong need for the companies to implement the said measures in order to further improve the constructions safety. The respondent tend to strongly agree that implementing all the proposed measures can improve that construction safety, safety Investment is a viable and worthy effort and safety indicators implementation is low.

Among recommended safety best practices are certification, guiding policy Overall safety plans and forming of safety and health committee regardless number of Workers, annual safety audit and review, safety indicators, annual safety targets, safety Performances in workers’ appraisal, implement good safety rules and practices like use of PPE at red zone, safety budget, good housekeeping, having ‘first-aid’ box, emergency Drill and access/egress and fire extinguisher at workplace, demarcate boundaries of red and green zones, job safety and hazard analysis, form emergency response team and conduct emergency drill and drug and alcohol test organize safety and Promotions and celebrate ‘Safety Day’.

REFERENCES

Construction industry Development Council, 2011. “Safety of the construction work force”, publications; Articles


