Safety in Construction Industry – An Empirical Study

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Abstract:- **This research study aims to define the conformance to the necessities of the occupational health & safety standard. Occupational hazards influence economic, social and individuals across the globe. Therefore, construction companies must frequently struggle to make a safer workplace being short term turn-key projects. An onsite construction audit is carried out on a sample size of 65 construction companies to measure the conformance to ISO 45001:2018.**

The data of researcher was collected through auditing which include documented review information, interviewing and by observation. The conformity assessment variables considered for this research study are Incident, Non Conformity and Corrective action which significantly determine the Safety at Construction sites. Likert scale of five point was adopted to quantify the results.

Jamovi software is used to analyze the data collected through research study. To determine the criteria of occupational health & safety standard, the level of compliance was studied. To demonstrate the compliance with requirements of Incident, Non Conformity and Corrective action the results were analyzed to find the scope for improvement.

Keywords:- Incident, Non Conformity, Corrective Action, Construction Safety, ISO 45001.

I. INTRODUCTION

BS OHSAS 18001:2007 is replaced with the ISO 45001:2018. A standard is published by International Organization for Standardization on Occupational Health & Safety management system. Due to occupational ill-health and injuries, the alarming statistics from International Labour Organization (ILO) indicates that annually over 2.3 fatal cases are estimated. The importance of providing a safer construction work site in the construction companies have recognized which would eventually reduce occupational injuries and illness leading to enhanced productivity and lower insurance premiums.

A dynamic exercise for every construction company is hazard identification and risk assessment and should be treated on priority which is even more significant for high risk procedures. The third party audit against the requirements of ISO 45001:2018 builds confidence in the stakeholders. External audits are neutral, independent and are conducted in accordance with ISO 19011 guidelines. As the audits are based on sampling, the risk of uncertainty might exist in the OHS management system. Therefore, construction companies need to analyse the importance of conducting internal audits at regular intervals based on the complication of the procedures and the risk type of their scope of industry.

II. RESEARCH GAP

Most of the research studies on occupational health & safety management system are dependent on the feedback collected from the construction companies. The major drawback in this type of methodology is lack of objective evidence to endorse the conformity.

III. RESEARCH METHODOLOGY

ISO 19011 (auditing techniques) standard was adopted for conducting an onsite audit of 65 construction companies. The means of audit data collection for determining the conformance to the requirement of the ISO 45001:2018 standard were Physical Observation at actual location, interviewing the process owners, workers including top management and confirming the OHS documented information. The outcome of onsite audit of the 65 construction companies were gathered from an ISO auditor and then the researcher has analyzed by using a statistical tool "Jamovi".

Likert scale is interpreted as:
1) Major non conformance
2) Minor non conformance
3) Neither conformance nor non-conformance (Inadequate evidence to determine conformity)
4) Conformance
5) Conformance with effectiveness of actions

IV. RESULTS AND ANALYSIS

Reliability Analysis

The assessment questions were framed as per ISO 19011. The conformity assessment variables were verified for compliance to ISO 45001 standards. The Cronbach"s alpha arrived to be acceptable value with α = 0.884; which indicate the assessment questionnaire has consistency and reliability as shown below in Table I.

TABLE I. **Scale Reliability Statistics**

	Cronbach's α
Scale	0.884

Descriptive Statistics

The „Incident" related with a sample size of 65 construction companies. The result of Likert scale resulted in Mean being 3.48, Standard deviation being 0.589 and Median being 3.0, as shown below in TABLE II.

TABLE II. **Descriptive of Incident**

	Incident
N	65
Missing	0
Mean	3.48
Median	3
Standard deviation	0.589
Minimum	3
Maximum	5

The frequency distribution for the Incident on a Likert scale; 3 point resulting 56.9%; 4 point contributing 38.5%, and Likert scale 5, point resulting 4.6% do not fulfill the requirement of the ISO 45001 on this criteria of Incident, as shown below in TABLE III.

TABLE III. **Frequencies of Incident**

Levels	Counts	% of Total	Cumulative %
3	37	56.9 %	56.9 %
4	25	38.5 %	95.4 %
5	3	4.6 %	100.0 %

The frequency distribution for the Non-conformity on a Likert scale; 4 point resulting 47.7%; 3 point contributing 52.3%, more than half of the sample size do not fulfill the requirement of the ISO 45001 on this criteria of non-conformity. There is a direct correlation between Table-1,

Incident and Table-2, Non-conformity, as shown below in TABLE IV.

TABLE IV. **Non Conformity**

| Frequencies of Nonconformity			
Levels	Counts	% of Total	Cumulative %
3	34	52.3%	52.3%
4	31	47.7%	100.0%

The frequency distribution for the Corrective Action on a Likert scale according to Likert scale 3 point indicates 63.1% which demonstrates that ineffective actions initiated by the sample. Furthermore, the systematic approach to address the corrective action is not being followed. The universal hierarchy of addressing corrective action is not demonstrated by the sample which means correction, root cause analysis, corrective action followed by reviewing the effectiveness of actions taken is not demonstrated.

Likert scale 4 point indicates 36.9% of the sample shows the conformity as shown below in TABLE V.

TABLE V. **Corrective Action**

Frequencies of Corrective Action			
Levels	Counts	% of Total	Cumulative %
3	41	63.1%	63.1%
4	24	36.9%	100.0%

The below Graph I, indicates that more than half of the sample size does not conform to the requirement to the ISO 45001 standard.
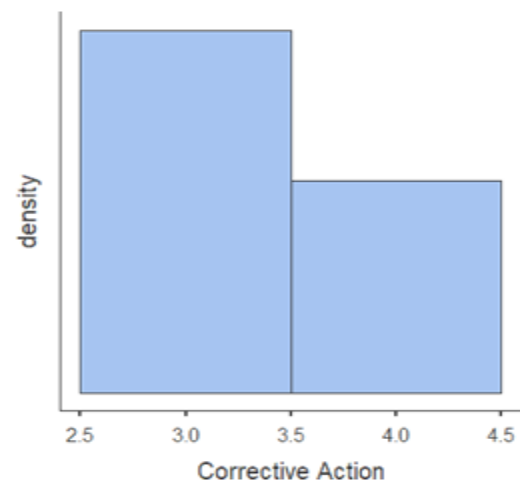
GRAPH I - **Corrective Action**

V. CONCLUSION

1. Awareness and Competency could be enhanced to address the incidents and non-conformity as per ISO 45001.
2. All incidents are not recorded especially first aid cases which also need to be investigated.
3. Inappropriate analysis for determining the root cause lead to repetition of incident and non-conformity.
4. Post incident and non-conformity the relevant documents to be revisited to determine the effectiveness, adequacy and suitability of the controls determined.

VI. SCOPE FOR FUTURE WORK

5. Factors influencing the compliance to the requirements of the standard could be investigated.
6. Variables for effective compliance for the turn-key construction projects could be analysed.
7. Value addition through Internal and External Audits of Construction Audits could be studied.
8. Cross country analysis on the potential construction hazards could be studied.

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