International Journal of
Civil Engineering (IJCE)
ISSN(P): 2278-9987; ISSN(E): 2278-9995
Vol. 4, Issue 6, Oct - Nov 2015, 29-38

International Academy of Science, Engineering and Technology
Connecting Researchers; Nurturing Innovations

A STUDY AND ANALYSIS OF OCCUPATIONAL HEALTH HAZARDS SUPERVISORY LEVELLED WORKMEN IN CONSTRUCTION INDUSTRY

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ABSTRACT

Workers in a construction site may be exposed to various hazardous substances and physical agents, e.g. asbestos, lead, silica dust, organic solvents, sewer gases, welding fumes, radiation, noise and vibration. Excessive exposures to these substances/agents may result in acute injury, chronic illness, permanent disability or even death. Loss of concentration at work and fatigue arising from poor health conditions may increase the risk of accidents.

Construction work is featured by high labour turnover, constantly changing work environment and conditions on site, and different types of work being carried out simultaneously by several contractors. These features would further increase the health risks of workers

KEYWORDS: Occupational Health Hazards Supervisory Levelled Workmen in Construction Industry

INTRODUCTION

The construction sector is a complex environment as both the workplace and the workforce are non-static. Nonetheless, there are common requirements of Health and Safety legislation and objectives for occupational disease reduction. The core elements of occupational health provision were identified and recommendations were made for health monitoring / surveillance of the main occupational conditions affecting the construction sector. The nature of the information to be collated means that the provisions of the Data Protection Act 1998, with regard to sensitive personal data will need to be accommodated. There are also ethical issues, which have been highlighted in this report and will require further discussion with the relevant Supervisory workman therefore

It is essential for any construction project to have certain solutions to minimize the health hazards.

Occupational Safety Hazards

Wrongly designed ladders and stairs

Occupational Health Hazards

Occupational health hazards associated with the construction industry include various diseases, mental and physical stress, disability and injuries. The potentially damaging factors are:

Noise

This causes hearing loss and also effects the heart.(3)

Vibration causes Raynaud's syndrome, a potentially damaging disease affecting the fingers. It also causes physiological orders.(3)

Dust – this mainly affects the respiratory system.

RADIATION

Improper Sanitation

SAFETY PRINCIPLES

Minimum standards for occupational health providers should be adopted.

- Construction employers should have policies which relate not only to safety but also occupational health strategy and provision
- Appropriate procedures should be adopted for the pre-placement confirmation of employee fitness
- Minimum standards are advised for health monitoring / surveillance for Hand Arm Vibration Syndrome, Noise Induced Hearing Loss, dermatitis, Respiratory disease (sensitisers, Silicosis and Chronic Obstructive Pulmonary Disease), Musculoskeletal problems and Stress.
- Minimum standards for Safety Critical Work are advised
- Consideration should be given to the legal and ethical issues identified in establishing a national database for the construction sector.

Need of Study

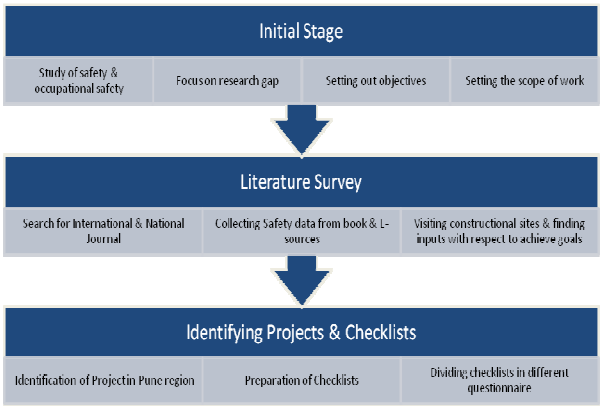
- The construction industry in India today is very large and complex, but the rapid growth has led to a shortfall in terms of safety and health aspects of the construction workers. This has happened largely due to lack of formal organizations combined with a gap in terms of suitable legislations and standards and their implementation. Occupational health hazards are mainly depending upon the employee's health condition & health enquiry. The capacity analysis of unskilled worker is not done.
- This study is analyzing a health hazards and concentrated on its impact on the occupational health hazards.

OBJECTIVES

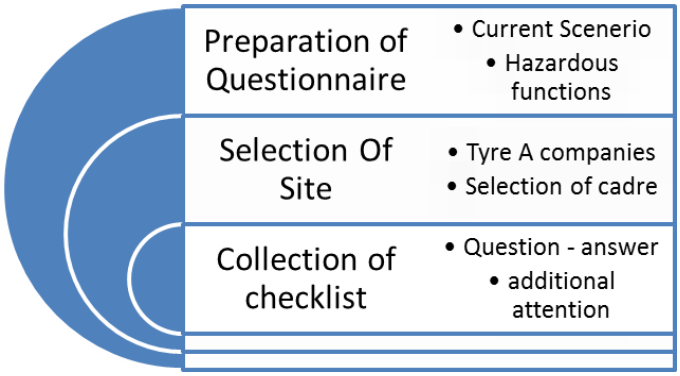
- To understand the occupational risk related to skill labour , workman in large real estate project.
- To prepare questionnaire on the identified parameters based on literature review & expert review to overcome the issues of occupational health.
- To identify the occupational health hazard risk and finding the criticality of the risk by ranking them
- To give measures to minimizing the occupational health hazards in construction industry

METHODOLOGY

Pre Questionnaire Survey



Questionnaire Survey



Preparation of Questionnaire

To overcome & study issues of occupational health hazard, this study provided a checklist which is based on literature, interviews & experience. Before proceeding to preparation,

Study of responsibilities of involved entities is very necessary. Responsibilities of employer, supervisor & Worker and worker rights are discussed:

Shown in Table 1.

Checklist divided into four parts:

- Health Aspects of the Designation
- Personal Details
- Present and Previous Employment
- Health History

Table1

Fom hazards & injuries. Part A is interested to know the Table. 1 deals with health aspect to designation. Health hazards are varying with designation. Skilled & unskilled workmen are suffered nature of work & working conditions (i.e. lone working, work at height, electrical work, vibrating work etc.).

Table 1

Occupational Health Hazards on Skill Labour in Construction Industry			
Check list for assessment of labour on their health & injuries			
Designation:safety incharge			
Working Hours:8 hrs			
Immediate Superior:sr safety incharge			
Contact Number:			
Part A: Health Aspects of the Designation			
(Please Teak on Option)			
Sr No	**Job Involves Working With**	**Yes**	**No**
1	Managerial responsibilities for people and/or systems		
2	Lone working		
3	Shift work/night work		
4	Work outdoors		
5	Work at heights		
6	Work in confined spaces		
7	Food handling or regular work in areas where food handling occurs		
8	Electrical hazards		
9	Regular Manual handling/lifting*		
10	Vibrating equipment		
11	Respiratory sensitisers		
12	Noise (more than 80dba-8hrs)		
13	Any other hazards, e.g. excessive dust		

Following Table 2 shows the Part B Personal Details which included name, date of birth, contact details, address etc. This part helps to correlate health issue with age of workmen.

Table 2

Part B : Personal Details	
Surname:	
Title:	
Date of Birth:	
Contact Details:	
Email:	
Address:	
Home Telephone:	
Mobile:	

Table. 3 shows the Part C employers details which included experience, nature of work and cadre of employee. This part helps to correlate health issue with nature of work and cadre of employee.

Table 3

Part C: Present and Previous Employment				
Please complete this section stating your current and previous job titles, listing any hazards exposed to				
Job title and hazards exposed to	**Employer**	**From**	**To**	**Details**

Table 4, part D deals with a health history of employee. Is he undergoing some diseases? Disease possessed by him, is an occupational? This part includes specified & general questions from which we can understand the overall health of workmen.

After analysis and finding of critical hazards, this study comes to on conclusion of hazardous working conditions & working methodology. On the basis of analysis, this study leads to find the solution for activities with discussion with professionals & study. Solution & conclusion followed by feasibilities study by post study survey.

Table 4

Part D: Health History				
(Please Teak on Option)				
Sr No	**Question**	**Yes**	**No**	**Details**
1	Have you ever been absent from work due to ill health during the last 2 years? If YES include: Number of days, state Reason.			
2	Have you ever left or been denied a job for health reasons?			
3	Have you ever been denied a driving licence for health reasons?			
4	Has your health ever suffered as a result of work?			
5	Are you currently receiving any medication or other treatment, including tablets, injections, physiotherapy etc, or undergoing any medical investigations?			
6	Have you ever had any physical limitations, including hearing or vision, which may affect your ability to work? If YES, please give details of any previous workplace adjustments.			
7	Have you ever had any kind of back, joint or muscle problem? If YES please give details of any time off work caused by this and any previous workplace adjustments.			
8	Do you have or have you ever had any: Skin problems, e.g. eczema? Allergies, e.g. latex or animals?			
9	Have you had any chest problems such as Asthma, Bronchitis, Tuberculosis or a persistent cough in the past 12 months?			
10	Have you ever had a drug or alcohol addiction?			
11	Have you ever had any mental illness which may affect your ability to work? (e.g. any psychological or emotional problems, eating disorders, anxiety, depression, self-harm) If YES, please give details of any time off work caused by this and any previous workplace adjustments.			
12	Do you have or have you ever had any other medical conditions, operations or disability which may affect or be affected by work, e.g. epilepsy, fainting or blackouts? If YES please give details of any time off work caused by this and any previous workplace adjustments.			
13	Have you had all your childhood vaccinations, including 5 doses of Diphtheria, Tetanus and Polio?			

Analysis by Weighted AVG Mean Method-

Analysis is done by weighted mean average method

- Mathematical definition

Formally, the weighted mean of a non-empty set of data

$$\{x_1, x_2, \ldots, x_n\},$$

with non-negative weights

$$\bar{x} = \frac{\sum_{i=1}^{n} w_i x_i}{\sum_{i=1}^{n} w_i},$$

which means

$$\bar{x} = \frac{w_1 x_1 + w_2 x_2 + \cdots + w_n x_n}{w_1 + w_2 + \cdots + w_n}.$$

Therefore data elements with a high weight contribute more to the weighted mean than do elements with a low weight. The weights cannot be negative. Some may be zero, but not all of them (since division by zero is not allowed).

The formulas are simplified when the weights are normalized such that they sum up to 1, i.e.

$$\sum_{i=1}^{n} w_i = 1$$

For such normalized weights the weighted mean is simply.

$$\bar{x} = \sum_{i=1}^{n} w_i x_i$$

Note that one can always normalize the weights by making the following transformation on the weights

$$w_i' = \frac{w_i}{\sum_{j=1}^{n} w_j}$$

Using the normalized weight yields the same results as when using the original weights. Indeed,

$$\bar{x} = \sum_{i=1}^{n} w_i' x_i = \sum_{i=1}^{n} \frac{w_i}{\sum_{j=1}^{n} w_j} x_i = \frac{\sum_{i=1}^{n} w_i x_i}{\sum_{j=1}^{n} w_j}$$
$$= \frac{\sum_{i=1}^{n} w_i x_i}{\sum_{i=1}^{n} w_i}.$$

The common mean is a special case of the weighted mean $\frac{1}{n}\sum_{i=1}^{n} x_i$

where all data have equal weights, $w_i = w$.

When the weights are normalized then $w_i' = \frac{1}{n}$.

The pt “YES” is given wt = 2

The Pt “NO” is given wt = 1

Sample calculation – IF of workmen. 6 out of 7 are thinking that ***managerial responsibilities RISK*** are more for people. Means 6 people saying “yes” and 1 people saying “NO” Then the weighted mean average for that particular risk = 6x2 + 1x1 / 7 = 1.85

On the basis of the method the criticality & risk will be decided.

- Managerial responsibilities for people and/or systems

  6 People say YES and 1 people say 1

  = 6 x 2 + 1x1 / 7 = 1.85

- Lone Working = 1 x 2 + 6x1 / 7 = 1.14
- Shift work/night work = 5 x 2 + 2x1 / 7 = 1.71
- Work outdoors = 5 x 2 + 2x1 / 7 = 1.71

- Work at heights = 5 x 2 + 2x1 / 7 = 1.71
- Work in confined spaces = 2 x 2 + 5x1 / 7 = 1.28
- Food handling or regular work in areas where food

  handling occurs = 0 x 2 + 7x1 / 7 = 1
- Electrical hazards = 4 x 2 + 3x1 / 7 = 1.57
- Regular Manual handling/lifting = 4 x 2 + 3x1 / 7 = 1.57
- Vibrating equipment = 5 x 2 + 2x1 / 7 = 1.71
- Respiratory sensitisers = 2 x 2 + 5 x 1 / 7 = 1.28
- Noise (more than 80dba-8hr = 6 x 2 + 1x1 / 7 = 1.85
- Any other hazards, e.g. excessive dust

  = 5 x 2 + 2x1 / 7 = 1.71

  On the basis of the method Ranking give the criticality of risk will be decided

Table 4.5

Sr No	Risk	Wt of Risk	Rank
1	Managerial responsibilities for people and/or systems	1.85	1
2	Noise (more than 80dba-8hrs)	1.85	1
3	Any other hazards, e.g. excessive dust	1.71	2
4	Shift work/night work	1.71	2
5	Work at heights	1.71	2
6	Vibrating equipment	1.71	2
7	Any other hazards, e.g. excessive dust-	1.71	2
8	Electrical hazards	1.57	3
9	Regular Manual handling/lifting*	1.57	3
10	Work in confined spaces	1.28	4
11	Respiratory sensitisers	1.28	4
12	Lone Working	1.14	5
13	Food handling or regular work in areas where food handling occurs-	1	6

Observation Discussion and Result on the Bases of Mathematical Analysis.

The use weighted AVG Mean Method of this table enables each risk or class of risks to be assessed and rated as high, or low. It is then possible to determine which risks must be given the highest priority for control. When deciding how to control a risk it is preferable that the hazard causing the risk is eliminated from the workplace altogether. It is a priority to eliminate the risk, if this cannot be achieved then the risk must be reduced so far as is reasonably practicable using the hierarchy of Control. use the risk score table to determine whether the risk is high, medium or low.

Following Risk Value is Consider High Risk AND Low Risk

High Risk – 1.6 to 2

Low Risk - 1 to 1.6

By the mathematical weighted avg mean method, ranking of the risk was carried out based on their criticality.

From these study ranking can be done as follows.

Managerial responsibilities for people and or systems.

- Manegerial responsibilities of system or people.
- Noise (more than 80 dba-8hrs)
- Work at height
- Shift work
- Excessive dust
- Lack of training

CONCLUSIONS

During the study the observations recorded at site execution, supervisory and unskilled levelled workers are exposed to various risks involved in construction works and other **occupational diseases** and **health hazards** which cause injuries and illnesses. From the present study following conclusions can be drawn.

- The occupational health hazard risk related to supervisory / unskilled workman are noise , dust particle, management responsibility ,lack of training, shift work, work at height.
- By the rating method, ranking of the risk was carried out based on their criticality. From the study ranking according to their severity can be done as follows
  - Managerial responsibilities for people and or systems.
  - Noise (more than 80 dba-8hrs)
  - Work at height
  - Shift work
  - Excessive dust
  - Lack of training
- On the basis of ranking suitable measures can be recommended as.
  - Management is most responsible for maintaining the health and takes care of employees regarding their occupational health. Maintain the healthy environment within an organization.
  - Shifting workers (riggers) are facing health issue with back pain, shoulder pain etc. shoulder pads and training should be given for such work. Working at a height should be permitted after training to worker & under the expertise.
  - Applying local exhaust ventilation to particularly hazardous processes, e.g. rock cutting, grinding, welding & Proper ventilation is provided at site for removing dust and noise.

- Using water suppression to control dust emission and eye protectors for protection against chemical splashes, such as goggles or face visors.

FUTURE SCOPE

- To study the solution for particular activity & post check for respective activity
- Research and monitoring must be carried out for harmful effects due to health hazard.
- The methodology can be extended to prepare complete system of occupational health hazard and management.
- The study must be conducted for finding the role & impact of health hazard in construction industry.

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