

OCCUPATIONAL HAZARDS AND SAFETY ASSESSMENT OF CONSTRUCTION WORKERS: A LITERATURE REVIEW

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Abstract: The construction industry is confronting on special safety and health concerns. Construction workers must work in an environment that is safeguarded against hazards. All firms should provide a safe working environment for their workers and subcontractors. Hence, Occupational health and safety (OHS) is a major point of concern. The project aims at identifying various such hazards and the institutionalization and implementation of legal acts in this context giving a few case studies about the same.

Key Words: Occupational health and safety (OHS), Legal framework, International Labor Organization (ILO), The Building and Other Construction Workers Act, 1996.

INTRODUCTION:

Occupational health hazards refer to the vulnerable risks to health and safety for those who work outside the home. According to the World Health Organization (WHO), around 70 percent of adult men and up to 60 percent of adult women throughout the world, an estimated additional 40 million adults enter the global workforce each year. The specific occupational health hazards faced by this large and growing number of people depend on the region and its economic standing. However, the following are some of the most common occupational health hazards faced by workers worldwide. The occupational health hazards internationally are mostly structural failures and mechanical or electrical accidents. It includes structures vulnerable to adverse weather conditions, moving and/or unprotected parts of machines, or equipment failure. These occupational health hazards exist fairly equally in developed. As defined by the World Health Organization "Occupational health deals with all aspects of health and safety in the workplace and has a strong focus on primary prevention of hazards." Health is basically defined as a state of physical, mental and social well-being and not merely the absence of disease. Occupational health is a multidisciplinary field of healthcare concerned with enabling an individual to undertake their occupation, in the many way that causes least harm to their health. Health is being defined as it contrasts with the promotion of health and safety at work, which is concerned with preventing a harm from any incidental hazards, arising in the workplace end developing countries, regardless of industry.

According to WHO basically there are two types of hazards in workplace :

- HEALTH HAZARDS
 - Chemical (asbestos, solvents, chlorine)
 - Biological (tuberculosis, HIV, hepatitis)
 - Physical (noise, heat and cold, radiation, vibration)
 - Ergonomics or Repetitive Strain Injuries (carpal tunnel syndrome, back injuries)
 - Psychological (stress)
- SAFETY HAZARDS
 - Slips, trips and falls
 - Being caught in or struck by moving machinery or other objects
 - Fire and explosions
 - Transportation and vehicle-related accidents

- Confined spaces
- Violence

SAFETY ON CONSTRUCTION SITE:

Construction is one of the most dangerous occupations in the world, incur more occupational fatalities than any other sector. In 2009, the accidental or fatal occupational injury rate among construction workers in the United States was around three times that for all workers. Falls are one of the most common causes of fatal and non-fatal injuries among construction workers. Proper safety equipment such as harnesses and guardrails and other alternatives such as securing ladders, use of safety belts and helmets and inspecting scaffolding can minimize the risk of occupational injuries in the construction industry. As a fact that, accidents may have disastrous consequences for employees as well as organizations, it is of critical importance to ensure health and safety of workers and compliance with HSE construction requirements. Health and safety legislation in the construction industry involves many rules and regulations. For example, the role of the Construction Design Management (CDM) Coordinator as a requirement has been aimed at improving health and safety on-site.

RISK ASSESSMENT:

Identify the hazards or Identify all affects by the hazards and how evaluate the risk and prioritize appropriate control measure. The calculation of risk is based on the likelihood or probability of the harm being realized and the severity of the consequences. This can be expressed technically as a quantitative assessment (by assigning low, medium and high likelihood with integers and multiplying them to obtain a risk factor), or qualitatively as a description of the circumstances by which the harm could arise. The assessment should be recorded and reviewed at regular intervals and whenever there is a significant change to work practices. The assessment include practical recommendations to control the risk.

LITERATURE REVIEW:

A study was conducted by various government organizations identified that about 22.68 million of the total workers were engaged in the construction industry, out of which 18.25 million were casual workers. According to 2001 census. West Bengal had 864,180 construction workers, of whom 827,910 were males and a small number of 36,270 were females.

The working conditions was such that the workers had to work 10-12 hours daily of which about 19% of the construction workers in the urban areas and 38% in the rural area were not eligible for paid leave. The Average Fatal Accident Frequency Rate (FAFR) in the Indian construction industry was 15.8 incidents / 1000 employees / year and construction hazards were eight times more riskier than in comparison with any other industry that was the manufacturing sector.

An extensive study was conducted among 28 workers in 2004 for the presence of *Allergic contact dermatitis* engaged in construction of roads in the districts of Hooghly and Howrah in West Bengal. There was a weird skin condition in all the cases that either started for the first time or increased rapidly after joining the job. Medical examination, lab investigation and interview technique to collect the data and the result indicated that chromate is the most frequent allergen among construction workers in this part of India. Access of allergens to most body parts of the workers was observed. Dermatitis was mostly present on the exposed parts such as face and neck, forearm, dorsum of hands.

An evaluatory study was done to basically assess the occupational health of women workers in the construction Industry in Mumbai. The sample consisted of 1052 workers, who were randomly selected. Data was collected by medical examination, lab investigation and interview techniques and found that headaches and backaches, as well as pain in the limbs were the major problems. 56% of women reported injuries resulting in work loss. They had no social life or any health benefits. Eye and skin disorders were common and noise-induced hearing loss (NIHL) and Respiratory problems were mostly found amongst

workers exposed to occupational hazards like dust, noise, heat, and exposure to dry cement, glass, adhesives tar and paint.

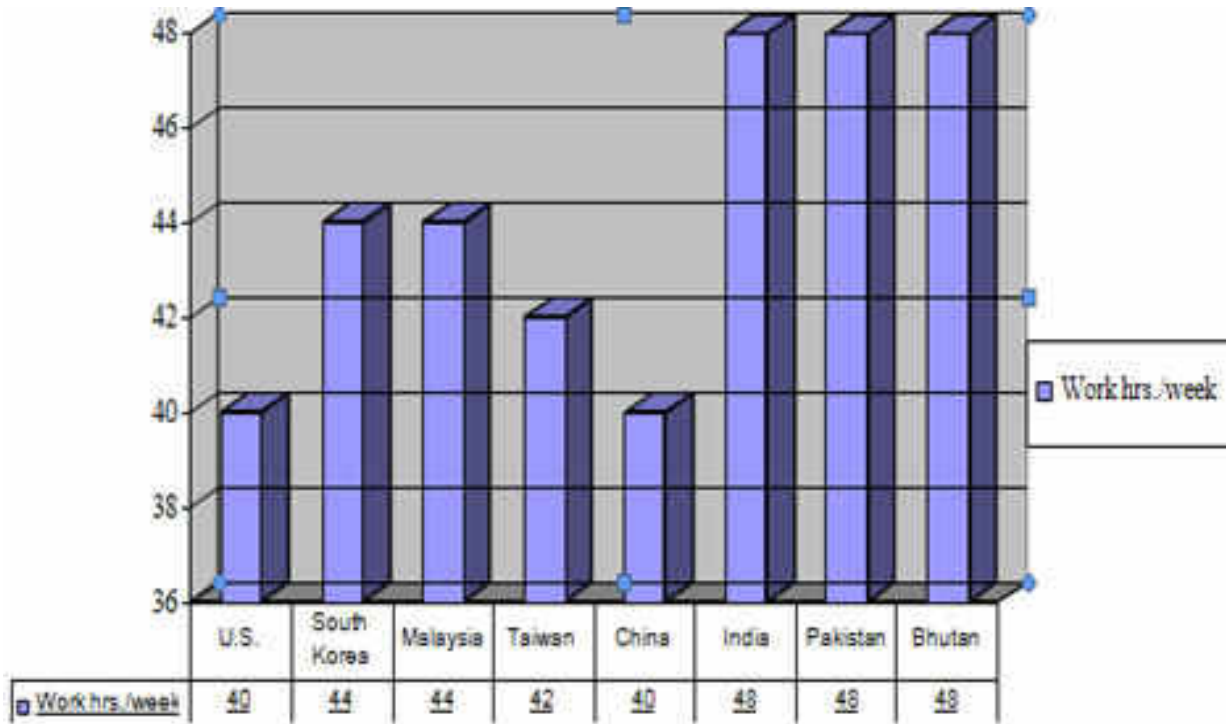


Figure 1 : Comparison of number of working hours per week
 Data sources: Department of Labor (U.S, Bhutan, China, India, Malaysia, Pakistan, South Korea),
 Council of Labor Affairs Taiwan

Figure 1 showing the difference in working hours of various countries.

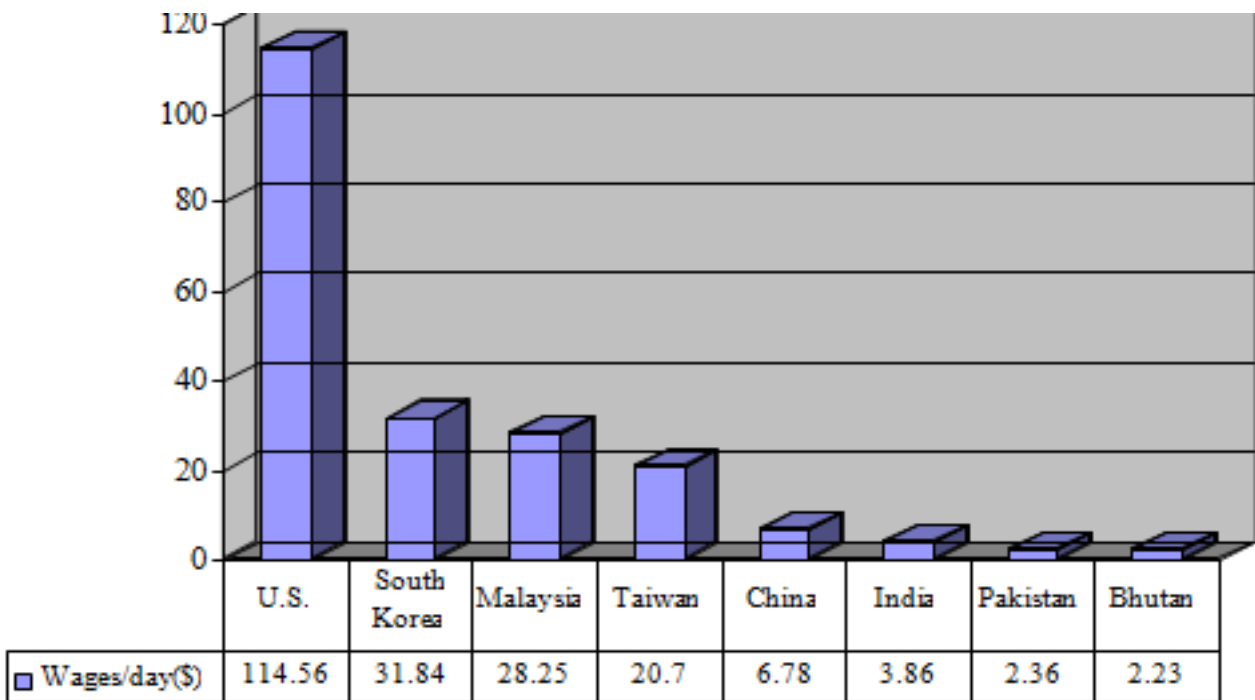


Figure 2: Average daily laborer's wage in construction (2005-2011)
 Data source: International Labor organization

Figure 2 showing the daily labor wages in dollars.

LEGAL FRAMEWORK FOR IN INDIA :

Table 1: Laws Governing OSH in Construction Industry

Countries	Laws governing OSH	Implementation of Laws
Bhutan	Chathrim for Wage rate, Recruitment Agencies and worker compensation Law 1994, Labor and Employment Act, 2007, labor administration policy and law, 2003	Low/none
China	Labor Law 1994,	Moderate
India	Factories Act 1948 (amended 1954, 1970, 1976, 1987), Workman's Compensation Act Employees State Insurance (ESI), The Explosives Act, 1884, The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989	Low/ None
Malaysia	Labor Law 1955, Occupational Safety and Health Act (OSHA) of 1994, The Factories and Machinery Act 1967	Fair- Good
Pakistan	Factories Act 1934, Workmen's Compensation Act 1923, Minimum Wage Ordinance, 1961	Low/None
South Korea	Labor Standards Act (last amended on 20 February 1998), Trade Union and Labor Relations Adjustment Act (last amended on 20 February 1998), Labor Relations Commission Act, Act Concerning the Promotion of Worker Participation and Cooperation, Korea Occupational Safety and Health Agency Law, 1987	Fair- Good
Taiwan	Labor Standards Law 1984, Labor Insurance Act 1958, the Employment Services Act 1992, Labor Safety and Health Law, 1974, The Labor Inspection Law, Occupational Hazard Prevention Program, Construction Industry Act, 2003	Fair-Good

Data sources: Department of Labor (Bhutan,, India, Malaysia, Pakistan, South Korea), Council of Labor Affairs Taiwan, Department of labor and social security China

Table 1 gives an insight about the law enforcements in various industries in various south Asian countries.

The existing set up in the Indian government consists of Ministry Of Labor And Employment which performs the functions relating to policy decisions and laying down guidelines for various industries. Among the various acts stated in Table 1 and the articles (21, 24, 39(e & f), 42, 43 (a) and 47) present in the Constitution of India, lies **The Building and Other Construction Workers (Regulations of Employment and Conditions of Service) Act, 1996** aims at regulating the employment and conditions of services of building and other construction workers and providing for their safety, health and welfare measures.

Through these Directive Principles of State Policy and The National Policy on Safety, Health and Environment at Work Place that was declared by then Humble Minister of Finance, Shri Pranab Mukherjee on the 20th February, 2009 at New Delhi during the Indian Labor Conference the Indian government tries to secure the safety of workers. While doing so the Indian government as a member of **ILO** draws its support from other ILO members.

Different organizations at lower levels include: The National Safety Council (NSC) and Central Board of Workers Education (CBE) undertake training and awareness creation activities in this sector, Directorate General of Factory Advice Service & Labor Institutes (DGFASLI) and Directorate General of Mines Safety (DGMS) assist in Occupational Safety & Health in factories & port sectors and mines respectively.

The functions of DGMS are to carry out Inspection of mines, Investigations and Enquiries into Accidents. DGFASLI, functions to provide training for Factory Inspectors and co-ordinates their training.

The Indian government also identifies the risk management process as an important part of OHS and thus the Indian standards regarding OHS are:

i) IS 15656: 2006 – Hazard Identification and Risk Analysis – Code of Practice which aims at upgrading safety in areas of chemical plants.

ii) **IS 18001: 2007 – Occupational Health and Safety Management System** – Requirements with guidance for use which guidelines for identification, assessment and control of risk in industries.

iii) **IS SP 70: 2001 – Handbook on Construction Safety Practices**

A Safety manual also provided by United Nations Development Programme (**UNDP**), India and there is also **NTPC Rules** among organizations self contained safety manuals. However there is a need for compliance and awareness among other tasks to be done.

CONCLUSION:

Building construction is an industry of high risk. The accident rate is very high when compared to other industries. The accidents occur due to the management and workers who lack safety awareness and perform unsafe behavior at work. In India where there are so much cultural and ethical differences, without comparing the economic feasibility and returns, stern steps should be taken by the construction firms. Inadequate Enforcing Authorities and Government Policies, Incorrect assessment of risks are the major factors that are hindering the implementation of OHS measures in India. An urgent need to involve the legislations and the firms to meet the challenges ahead in the construction industry is a task yet to be done.

REFERENCES:

1. Report Of The Working Group On Occupational safety And Health For The Twelfth Five Year Plan (2012 To 2017) Government of Indian Ministry Of Labor and Employment August – 2011.
2. A review on the occupational health and social security of unorganized workers in the construction industry Guddi Tiwary, PK Gangopadhyay, Department of Epidemiology, Regional Occupational Health Center (E), Indian Council of Medical Research, Bidhan Nagar, Kolkata, India.
3. National Sample Survey Organisation [NSSO] Employment and Unemployment situation in India 2005-06, NSS 62nd Round, Ministry of Statistics and Programme implementation, Government of India. 2008.
4. Fernandes D, Paul B. : Social Network of migrant workers in Construction Industry: Evidence from Goa. Tata Institute of Social Sciences. 2009:1–24.
5. NIC classification. West Bengal: 2001. Census of India: Economic Activity.
6. National Sample Survey Organisation [NSSO] Informal Sector and conditions of employment in India 2004-05, NSS 61st Round, Ministry of Statistics and Programme implementation, Government of India. 2007:60–1.
7. Jain SK. : Meeting the challenges in industrial safety management in construction industry. Nuclear Power Corporation of India Ltd. 2007:2.
8. Sarma N. Occupational allergic contact dermatitis among construction workers in India. Indian J Dermatol 2009;54:137-41
9. Zwerling, Craig.: Injuries among construction workers in rural Iowa: Emergency department surveillance. Journal of occupational and environmental Medicine 1996 July; 38(7): 698-704.
10. Adeeba A. Raheem, Jimmie W. Hinze M. E. Rinker, Sr. School of Building Construction, University of Florida, Gainesville, Florida, USA.
11. Salman Azhar McWhroter : School of Building Science, Auburn University, Auburn, Alabama, USA
12. Legal Framework For Occupational Safety & Health In India By Lt Col L Shri Harsha Deputy Project Manager, Married Accommodation Project, Delhi
13. Fifth India-Eu Seminar On Employment And Social Policy “Occupational Safety And Health” (New Delhi – September 19-20, 2011)