

Occupational Health Hazards among Construction Workers in India

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Abstract: *Construction industry is one of the stable growing industries of the world and construction labour form 7.5% of the world labour force. In India, it is the largest economic activity after agriculture. The construction workers belong to the disorganized workforce. Because of this, they have been exploited for centuries by not providing them with adequate housing, pay, vacation, medicine and medical care. Improper equipment and no safety equipment are provided to the construction workers. Occupational hazards for construction workers range from very minor pain to serious and even fatal illness. Major work - related health problems include musculoskeletal disorders, hearing loss, vibration and contact dermatitis. Migrant construction workers are at a greater risk of developing certain health disorders and sickness than workers in many other industries. These problems can be prevented by pre - testing devices, products and processes. Exposure monitoring and risk assessment are an essential part of workplace health and safety programs*

Keywords: Construction workers, occupational health hazards, personal protective equipment, Construction industry

1. Introduction

1.1 Construction Industry

Construction industry is one among the major and important industry of the world and Construction activities are an important component of the developmental work in India. This industry has been on a high rise due to modernization and industrialization¹. The construction industry is the economy sector that converts various resources into constructed physical economic and social infrastructure which is essential for the socio - economic development.

This has been one of the fastest growing sectors of the economy in recent years and after agriculture, construction industry provides largest employment for people. One among every seven workers in the country are being employed in construction - related activities. However, construction industry is one among the most unregulated sectors in the country. Small towns and cities are now becoming urbanized due to which the construction industry is also improving². Notwithstanding the fluctuations in the Indian economy, the construction industry is growing even faster. In addition to the old and traditional city and industrial centers, new industrial and city centers are also carrying out major construction works on a large scale. Due to the development in the construction industry, which opens up new job opportunities, more and more workers are being drawn into the industry^{3,4}.

1.2 Construction process

It encompasses the process by which said physical infrastructure is planned, designed, procured, built or manufactured, modified, repaired, maintained and demolished. Construction is a high - risk industry that encompasses a wide range of activities involving construction, alteration and/or repair. Examples include

housing construction, bridge building, road paving, excavation, demolition and large scale painting.

1.3 Work at construction industry

Construction workers engage in many activities that can expose them to serious hazards, such as: Falls from roofs, unattended machinery, hits from heavy construction machinery, electrocution, silica dust and asbestos. Compared to other industries construction has a greater risk of gradually deteriorating health and developing diseases. The large number of workers employed in construction lack even minimal safeguards. They continue to work in extremely dangerous and exploitative conditions. With no one to support them in their distress, they have few opportunities to improve their fortunes. This condition prevails throughout the country².

1.4 Conditions of Construction Workers:

The construction companies do not care about the health of their workers. Almost all companies do not provide medicines to workers. However, some companies and the site workers argue with each other about the medical costs involved in medical treatment. Maternity leave is not granted to employees. In most cases, companies do not compensate employees for partial or full damage and are also not covered by life insurance. Safety materials and equipment such as helmets, gloves and shoes, safety belts and goggles are also rarely provided to construction workers^{8,9}. There are no vacation opportunities available to construction workers. Some companies inefficiently grant workers sick leave and maternity leave. The construction site is not recommended by any vacation policy. The working hours of construction workers vary, most of them work 8 to 11 hours a day⁵.

In addition to the daily workload, they face environmental pressures as they have to work outdoors most of the time.

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Heat stress has a significant impact on the worker's cardiovascular and thermoregulatory systems. They are not properly dressed and do not follow the work and rest cycle. Therefore, environmental stress can affect their efficiency⁶.

Many scientists and researchers have reported on various occupational health risks in construction workers. Due to the very low manpower costs in developing countries, there is manual handling of various objects on almost every construction site, which causes most accidents at work⁷.

Snook was the first to point out risk factors related to construction work⁸. The most important factors for the bricklayers are people's posture, repetitive jobs, working on elevated surfaces, manual handling of raw materials, etc. Musculoskeletal disorders are one of the occupational problems faced by construction workers, leading to decreased productivity and poor quality of life⁹.

1.5 Construction Workers

The construction industry employs a wide range of skilled workers. These are bricklayers, carpenters, plumbers, electricians, painters, benders, mosaic workers, stone breakers, specialists for laying tiles, painters, etc. There are different levels of specialist knowledge and skills among the specialists. There are also specific groups of laborers who work collectively and specifically as concrete crews, earthworkers, well workers, woodworkers, tree fellers, and so on².

Construction workers are mainly workers who have immigrated from various regions and states and left their home villages to seek employment. These workers travel from one area to another with their families. They usually reside in accommodation provided by the contractor's contractor, or sometimes erect temporary accommodation on site. Due to the nature of their work, they are very mobile¹⁰.¹¹ These workers are involved in gigantic industrial buildings, residential colonies or townhouses and city beautification works. The construction workers are part of the unorganized sector and therefore the most exploited. In the recent past, recruitment of construction workers occurs in major cities and urban areas of the country. Most construction workers are illiterate; giving them limited employment choices to survive. Due to illiteracy, they face numerous problems due to lack of experience and skills¹².

According to the reports, there are currently more than 20 million construction workers in India. Their work consists of hard physical labor under difficult conditions such as adverse weather conditions and the nature of the work, working hours, low wages, poor living conditions with lack of basic amenities and separation from family, lack of job security and lack of access to decent employment and health services aggravate the situation¹³. Due to ergonomic problems, they are also prone to degenerative diseases¹. The workers employed on most construction projects are disorganized and often do not comply with laws designed to protect the health and welfare of workers and are therefore not entitled to free or subsidized care¹⁴. They are susceptible to numerous physical, chemical and biological influences and therefore develop various health problems such as

respiratory problems, dermatitis, musculoskeletal disorders and gastrointestinal disorders¹⁵.

Causes of Occupational Hazards in Construction Industry

As an industry, construction is one of the industries that pose hazards to workers. These occupational hazards can be due to negligence on the job site, mishandling of equipment and materials, lack of coordination between workers, and sometimes apparent disregard for site safety regulations. Research shows that the following hazards are most common on construction sites²:

- Scaffolding system
- Electrical access devices.
- Danger from a ladder
- Roof work
- Manual handling
- Plant and machinery
- Excavation work
- Fire and Emergencies
- Hazardous Substances
- Noise
- Protective Clothing
- Lifting and Body Exertion
- Unsafe work areas

Health problems due to construction work

Work related Musculoskeletal Disorders: Musculoskeletal disorders are inflammatory and degenerative conditions that affect muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels, causing pain or discomfort. WRMSD develops over time and is not curable¹⁶.

ENT problem

Almost 35% of construction workers are exposed to significant levels of noise during their working hours, which can lead to permanent hearing loss.¹⁷

The studies on noise - induced hearing loss (NIHL) conducted by Merck, Rampal and Ismail showed that it is one of the main problems for construction workers exposed to noise levels of 85 - 120 decibels.¹⁸

A study conducted by Hiranandani found that the sinusitis problem is common among construction workers due to the dusty environment at construction sites.¹⁷

Vibration

Almost 63% of construction workers are regularly exposed to vibration at work. Hand - arm vibration disorders are usually related to the use of powered hand tools and can damage the nerves and blood vessels in the hand and arm. Operating heavy machinery and vehicles can cause whole - body vibration.¹⁷

Skin diseases

More than 15% of construction workers handle or touch hazardous materials, including coarse materials, during work hours. This can lead to occupational skin problems such as dryness, redness and itching of the skin. The skin may

become swollen, cracked, scaly, and thickened, and blisters and occupational dermatitis may develop.¹⁷

Studies by Jolanki et al. showed that allergic skin problems or skin ulcers occurred in construction workers due to exposure to chromium materials.¹⁸ A study conducted by Lakhani found that skin cancer results from excessive and prolonged exposure to radiation.¹⁹ Shah and Tiwari observed that construction workers handling cement materials were susceptible to irritants and contact dermatitis. In addition, the caustic effects of alkaline ingredients such as lime can lead to allergic contact dermatitis (from ingredients such as chromium) in workers on construction sites.²⁰

Respiratory diseases

Diseases such as silicosis, asbestosis and cancer are common among construction workers. Most construction workers are exposed to fumes and dusts for at least half of their working hours. Prolonged occupational exposure can cause significant lung damage and even lead to the development of other respiratory diseases such as silicosis, asbestosis and cancer. The breathing problems can occur due to exposure factors such as diesel exhaust from machinery, dust from the ground and wood dust from sawing, fumes from welding, roofing or paving work, and dust from using pneumatic tools on concrete or other stone work and cement.¹⁷

Sundaraj conducted a cross-sectional study of respiratory problems and reported that 17.7% of workers suffered from chronic asthma; 12.9% had chronic bronchitis; 23.5% of the workers had chronic rhino-sinusitis and 54.4% of the construction workers had a peak flow anomaly.²¹

Cardiovascular problems

There are many risk factors that can lead to cardiovascular problems in construction workers. The National Institute for Occupational Safety and Health (NIOSH) reported that the prevalence of cardiovascular problems among adults in the construction sector was due to exposure to toxic heavy metals such as lead.²²

Several previous reports by Hong et al., Pope et al. and Maheshwaran et al. have shown that air pollution is an important risk factor for ischemic heart disease, especially inhalation of wood dust, metal dust or asbestos fumes.²³⁻²⁵

Analysis by the Agency for Toxic Substances and Disease Registers (ATSDR) found that the use of copper material also leads to eye problems and cardiovascular diseases in construction workers due to exposure to the arsenic materials used on the construction sites.²⁶

Previous studies found that the substances in cigarettes such as arsenic, nitrogen oxides, cadmium and other cause serious health problems

Phoon reported that myocardial infarctions are common among unskilled and manual workers because these workers smoke.²⁷

Bradshaw et al. reported that the high prevalence of male to female smoking observed among construction workers in South Africa also contributed to heart problems.²⁸

Eye problems

According to ATSDR's report, chemicals such as fluorine and fluorides and active ingredients such as aliphatic and aromatic amines used on construction sites can cause eye irritation in construction workers.²⁹

In the epidemiological studies conducted by Thienen and Spee, it was reported that diesel exhaust fumes are considered to be one of the major health hazards causing eye irritation.³⁰

Fever

According to the study by Basu et al. fever is one of the most serious health problems, especially among female construction workers.³¹

Adsul et al. analyzed the health problems of migrant construction workers in Mumbai and found that 23.11% of construction workers were affected by fever.³²

An epidemiological study by Wheeler and Smallwood found that welding fumes and certain materials used in the coating process, as well as these metal fumes, are released into the air, which is harmful to workers and causes fever.³³

Injuries

In general, all skilled, semi-skilled and unskilled workers are at risk of being injured, dying or suffering from various diseases on a construction site, with the level of risk varying depending on the job they are performing. Workers on construction sites are generally exposed to excessive stress and risk of injury on the job.³⁴

Several studies have documented that almost 45% of workers have been affected by external injuries for various reasons during their working hours

One of Sashidharan et al. A study conducted in Kancheepuram district shows that skin injuries such as abrasions and lacerations (43%), bruises (26%), lacerations (16%), foreign objects in the eyes (12%) and falling from a height (10%) were common.³⁵

Gauchard et al. reported that more than a third of workers suffered serious accidents because they were pressed for time to complete work, largely due to failure to observe safety precautions.³⁶

CNS problems

According to the NIOSH report, the CNS problems in adults in the construction sector are due to exposure to toxic heavy metals such as lead, which is widely used in various building materials such as paint.³⁶ A similar finding was observed by Dick regarding the use of organic solvents in construction, which could lead to CNS problems.³⁷

Urinary tract infection

The unsanitary contamination conditions in the workplace and in residential areas are a major risk factor for UTIs. According to the ATSDR report, the excessive use of copper compounds and other heavy metals in the construction industry can lead to kidney damage.³⁸

Infectious diseases

The poor environmental conditions at the workplaces increase the risk of diseases due to poor sanitation and unsafe drinking water. The construction and living areas create breeding grounds for various vectors and expose the unprotected workers to vector - borne diseases. In addition, construction workers are also at risk of being exposed to new strains of multidrug - resistant organisms.³⁹

Adsul et al. found in their study that 23.11% of workers suffered from any type of fever, followed by respiratory infections in 12.6% of workers.

Malaria was suspected in 20.71% of the total febrile cases, with a malaria positivity rate on the slide of 8.11%.³²

Several studies have shown that the highest morbidity rate among construction workers is due to musculoskeletal problems, external injuries, skin and eye problems, abdominal problems, respiratory, dental and urinary tract problems, fever, ENT problems, CNS problems and heart problems with psychosocial problems that were widespread among workers. It has been found that the prevalence of smoking, alcohol use and tobacco use among workers is very high compared to other population demographics. It has been proven beyond a doubt that tobacco use, smoking and alcoholism contribute to various acute and chronic debilitating diseases.

2. Recommendations

Based on the review, the authors suggest the following recommendations

Workplace: Effective health and safety management should be implemented on construction sites. In order to avoid the risk of accidents at work, safety measures in the workplace should be reviewed regularly. Labor office officials should visit construction sites frequently to monitor working conditions. Efforts should be made to improve conditions to reduce the risk of injury by providing appropriate lighting or to reduce the risk of slipping injuries while workers are working manually.

Work equipment: The tools used by the worker should be ergonomically designed to reduce the amount of effort required to do the job. The availability of mechanical aids must be guaranteed if required according to the task.

Training to Worker: Construction workers should be trained to increase their knowledge of ergonomic principles so that they can identify and avoid unsafe working conditions. Workers must be persuaded to take care to avoid hazardous conditions.

Policies: Potential women should be involved in the development and implementation of macroeconomic and social policies by involving and preparing their participation in such processes. In order to improve the working conditions of women workers, concerted and targeted efforts by various organizations such as trade unions, employers' associations, women's organizations and NGOs are required.

Work task: One of the main job challenges is to reduce the physical demands of the job, which means reducing the center of gravity, awkward posture, vibration, proper lighting, and strength levels. The work task often requires the use of manual material handling equipment. In order to reduce production pressure, the main contractor and its subcontractors must consider arranging for an increased number of manual labor for the work task.

Physical work environment: The results show that a poor physical work environment is due to poor and inadequate planning. A suitable site layout should be created to adapt to the constantly changing working conditions on the construction site. Responsibilities must be set out in detail in contracts and tenders and it must be ensured that these are discussed with employees.

Role of NGOs: NGOs and other organizations can raise awareness of better working conditions in female workers' unions and workers' cooperatives. Awareness of the safe working section should be encouraged. Labor rights NGOs should advocate for safe construction work.

3. Conclusion

The construction industry is an ongoing industry. As the population grows, so do the demands on structures in the form of houses, shopping malls and societies. The construction industry is currently at its peak. The government and the entrepreneurs must try to understand the situation of the construction workers. The health of the worker directly affects the work of the branch. Therefore, the health of the worker must be the primary concern of reformers. Efforts must be made to apply ergonomic principles to ensure user comfort and mitigate the degenerative effects of work.

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