

Analysis of Occupational Hazards and Safety of Workers in Selected Working Environments within Enugu Metropolis

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Abstract

Workers in various occupations have been subjected to various enormous pains and sufferings. The workplace is supposed to be the second home of the workers, having put in a lot of hours in the workplace each week. Unfortunately, some of the hazards faced by workers are brought about by the ignorance of the workers, resulting in the workers not adhering to the guiding rules in the occupation. Besides, the employers themselves also contribute towards bring these hazards into place in the working environment. This paper, therefore examined the various hazards faced by workers in various occupations in Enugu Metropolis. Occupations in seven industries of agriculture, building, construction, Energy/power, communications, Education and transport were studied. Questionnaires were used primarily to collect data. Descriptive statistics of frequency distribution and percentage were used in the analysis of data. The findings included that there was no policy guideline in each of the industries studied in the area. It was recommended among other things that employers should improve working conditions of workers in the industries and organize seminars, education programmes and ergonomic interventions so as to ensure that workers remain healthy.

Keywords: Occupation; Hazards; Safety; Workers; Enugu

Introduction

The working years of an individual are mainly spent in work environment. Hence, the workplace is supposed to be an ideal place for promoting the health and wellbeing of the employees and the employers. ISO 14001 (International Standards Organization 14001) provides the framework for performance improvement, control and directional compliance as well as demonstrates commitment to stakeholders. As ISO 14001 is not regulatory but voluntary, not all organizations aim to achieve it, possibly as a result of costs. The laws which relate primarily to safety of workers are covered mainly under the occupational health laws.

The productivity of industries in general is directed at generating income and profits through the utilization of resources in productive activities, producing goods and, products or services within their operational spheres. Among these resources are personnel (workers), production facilities and the production (work) environment.

Poor and unsafe working environment, rapid introduction of new industries, inventions and application of new tools for mass production and other processes tend to pose serious danger not anticipated to the employees. Thus, employees become a special risk group. They become exposed to injuries, illnesses, work disruptions and fatal accidents. These potential harmful factors-hazards-co-exist with them in the industrial operational spheres.

The diverse occupations in Enugu Metropolis, their injuries, and associated hazards, which vary from industry to industry, are discussed in this study.

Literature Review

Occupational health and safety refers to conditions and factors that affect, or could affect the health and safety of employees or other workers (including temporary workers and contractors personnel), visitors or any other person in the workplace. The problems associated with this can be regarded as diseases, accidents or other hazards arising from work environment or situations that arise in the attempt to perform tasks in any occupation. It is indeed, a compensable disease that arises out of and in the course of employment [1].

Agriculture is one of the most hazardous occupations worldwide. There is a trend towards the progressive deterioration of health status of agricultural workers with the greater distance from urban centres. In several countries, the fatal accident rate in agriculture is double the average for all other industries. According to International Labour Organization, estimates from a total of 330,000 fatal workplace accidents worldwide, some 170,000 agricultural workers are killed each year. Agriculture workers are often at risk of such work-related injuries as lung disease, noise induced hearing loss, skin disease, as well as certain cancers related to chemical use or prolonged sun exposure. On industrial farms, injuries frequently involve the use of agricultural machinery. The most common cause of fatal agricultural injuries in the United State is tractor rollovers. A study carried out by the social security institute of Panama in the 1980s in three agricultural sectors (Banana, Sugar Cane and Coffee Plantations) heightheld as major causes of accidents; mechanical devices and manual tools, physical devices such as noise and thermal stress, agrochemicals and biological agents as well as static and dynamic workload. The Brazilian Institute on occupational safety and Health carried out a study on occupational accidents in the rural sector in the eight states where there was a higher concentration of agricultural activities from 1987-1990. This showed that 39.45% of the total injuries were due to manual tools, 12.68% caused by accidents with machinery and the rest minor injuries due to different causes [2]. In Chile, the labour inspectorate reported in 1993 that injuries due to machinery and tools accounted for over one third (35%) of all cases of occupational injury. In South Africa, mortality in family due to only non-chemical occupational accidents was twice that

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of the industries. In United States, Machinery related accidents have been identified as the second leading cause of traumatic occupational fatalities between 1980 and 1989 [3]. These accidents resulted in 8,505 civilian workers' death, with an average annual fatality rate of 0.8 per 100,000 workers.

Observation in 2007 was that the global work force stood at 2.8 million with approximately 300,000 employed in the wood and wood products industry globally, with 2.2 million wood related fatalities and 270 million occupational injuries occurring annually [4]. The largest number of fatalities was associated with the timber industry with 92 deaths per 100,000 workers in 2006. Europe's wood and wood products industry suffered around 90,000 work accidents involving more than three days off-duty from work in 1998 and timber processing accidents and illnesses rose by 5% in the period 1996-1998. In Italy, the wood processing industry in general rates as one of the most hazardous occupations [5]. Rotating devices, cutting or sheering blades running up points and meshing gears are examples of workplace injuries, while crushed hands, severed fingers, amputations and blindness are typical wood working accidents [6].

Majority of formal employees are in the wood processing in Gabon. This occupation gulps more than 30% of the active population. Out of 825 injuries, wood processing constituted 24.2% of wood workers injured in 2007 and 19.3% in 2008. During the period 2007-2008, accidents involving contacts with equipment exceeded all other events accounting for 64.1% of traumatic occupational accidents in wood processing [7]. In Zimbabwe, wood and wood products are ranked among the major accidents, injuries and disease industries and in Minicaland province, they are at the foremost [8].

In both the United States and in Europe, construction is one of the most dangerous occupations, incurring more occupational fatalities than any other sector. Falls are among the most common causes of fatal and non-fatal injuries among construction workers. In 2009, the fatal occupational injury rate among construction workers in the United States was nearly three times that of all workers [9]. Construction workers are exposed to a wide variety of health hazards on the job. Exposure differs from trade to trade from job to job, by the day, even by the hour. The severity of each hazard depends on the concentration and duration of exposure for that particular job. Hazards that are common to nearly all construction include, heat, risk factors for musculoskeletal disorders and stress. Strains and sprains are among the most common injuries among construction workers [10]. These and chronically disabling musculoskeletal disorders occur as a result of traumatic injury, repetitive forceful movements, awkward postures or overexertion. The National Institute for Occupational Health and Safety (1999) [11] related the development of musculoskeletal pain to work or activities that involve repetition, vibration, lifting forceful movement, awkward posture, heavy physical load and static work posture.

Assessing electrical injuries Jenks (1996) [12], asserted that electricity poses a danger to many workers. According to him, electrical injuries can be divided into four types: fatal electrocution, electric shock, burns and falls caused by contact with electric energy. Electricity has great potential to seriously injure and kill. The average person can receive critical injuries as a result of even very short exposures to everyday 240-volt simple-phase alternating current supply voltages.

Examining the hazards associated with computer operators in communication industry, Brown [13] noted that Radiation computer emit weak electromagnetic fields and very low levels of radiation not

visible to the human eye, and which can be detected by the use of sensitive instruments. In an Arabian study by Shikdar, and Al Kindi, they reported that the major work relating to musculoskeletal disorders among computer users include eye strain, shoulder pain, back pain, forearm pain, wrist pain and neck pain. Adedoyin [14] reported 74% and 73% as the prevalence of low back pain and neck pain among computer users in Nigeria respectively. Okwuosa observed that the visual display unit (VDU) has in a very short period of time, emerged from comparative obscurity in scientific laboratories to become an integral and indispensable part of normal work life for millions of people in workplaces. According to him, the computer revolution is total and has completely replaced the industrial revolution of the last 150 years or so.

In transportation industry, in his study, Weinhold [15], reported that traffic can be responsible for as much as 90-95% of the ambient carbon levels in the city centres, especially on highly congested streets. This invariably poses a significant threat to human health and natural resources. In Nigeria, Moughalu [16] in his study reported that Nigerian urban population rose from 0.9 million in 1921 to 3.1 million in 1952, 10.7 million in 1963 to 37.17 million in 1991. Also, the size and number of urban cities in the country have been on the increase since the pre-colonial period. Nigeria has a total of about 29 urban cities in 1912. In 1953 the number had reached 56. By 1963 and 1991 the profile showed 182 and 359 urban cities respectively for the country. Similarly, the percentage urban population has continued to increase over time. In 1921 about 7.8% of the nation's population lived in urban cities while 92.2% lived in rural areas. By 1963 and 1991 it rose to 19.3 and 35.3% respectively [17]. This rapid growth in urban population has profound impact on the air quality situation, which arises as a result of increased vehicular emissions. This is especially true in the developing world mainly due to high proportion of old, poorly maintained vehicles and poor fuel quality. Besides, road accident fatalities continue to attract the attention of policy makers and the populace all over the world, while for example developed countries have experienced a decrease of this trend since 1960s, the fatality rate in African countries ranges from 10th fold to more than 100 fold of those in United states [18]. It was also reported that while South-East Asia has the highest population of global road fatalities-one third of the 1.4 million occurring each year in the world- the road traffic injury mortality rate is highest in Africa (23.3 per 100,000 population) compared with 11.0 in Europe.

In terms of vulnerability Valticos [19], observed that road traffic injuries and fatalities are mostly concentrated on males of their most productive age. According to him, young drivers have been found to have higher rates of accidents than older drivers. Statistics have also shown that mortality in road traffic accidents is very high among young in their prime and who also constitute the workplace. Furthermore Schram (1997) [20] in his studies found out that pedestrians account for between 45% and 75% of all road traffic deaths in developing countries, and that these are usually the breadwinners in many cultures. Although it is said that causes of traffic crashes and fatalities are varied Nwachukwu [21] identified three major categories, which are human, vehicle and highway infrastructure. Among the three factors, the human factors including road user behaviour and incapacitation have been found to account for more than 85%.

In teaching occupation, asserted that most of the teachers face numerous physical and psychological problems due to workload and stress at school. According to Lucas (1984) [22] it is a demanding occupation and teachers may be more sensitive to the development of speech and language impairments. In his Mayo Clinic study on aging,

conducted in 2013 on a group of more than 400 people with Alzheimer disease, it was found that people with speech and language disorders were teachers and three and half times more than patients with Alzheimer disease.

In developing corrective actions or preventive measures to eliminate or limit the problem, Reich and Okubo, [23] asserted that some of the preventive measures could only be achieved by safe working environment and other conditions that encourage and promote healthy living and ergonomics in machine design and operations. In agricultural involvements, Achalu 2000 and Asogwa 2007 [24,25] have in their studies recommended various ways of eliminating hazards or reducing them where they cannot be eliminated. According to them, artificial insemination could be used instead of handling hazardous chemicals, contractors could be used to spread sturry, contact with livestock can be reduced by improving cattle-handling facilities, information, training and supervision can be provided by ensuring that every person on the farm has all the information and skills necessary to secure health and safety.

Balsari (1999) [5], provided intervention ideas for addressing musculoskeletal disorders in saw mills which include; work floor management such as matching work flow to workforce numbers, reducing breakout force from tables by using roller chains, optimizing workforce layout and geometry, good trolley design, task technique training to cover range of scenarios and techniques suitable for task requirements.

Nwachukwu (2003) [21], opined that some straight forward ways to reduce injuries in metal fabrication include; proper use of forklifts or cranes to unload heavy materials, appropriate training and use of effective lifting methods and employment of trolleys to transport materials between stages of the Fabrication process. Besides, shop managers should ensure that the ventilation systems work and possibly provide personal protection gear such as respirators. Furthermore, limitation of time of exposure according to Asogwa (2007) [7] allows the maximum tolerance known daily, hours of work be arranged so that no worker stays longer than the prescribed period of time. When working in proximity to electrical hazards, Akinola suggested that hazard identification and risk control measures implemented. To protect computer operators from computer related injuries, Wijan (2005) [26] advocated that computer operators should not sit too close to the screen and should not use very small fonts; they should not look at the screen for very long periods without a break and should not place the screen directly in front of bright window.

Furthermore, it has been advanced that all cybercafés and computer centres be assessed for risk computer equipment be made to be fit for the job to avoid strains and discomfort, all computer operators and users be made to take regular breaks from computer work, training on computer operators and users, and computer operators and users be given relevant information relating to their health and safety. The preventive measures according to Clark (1999) [27] for transmission from school environment or from infected student or contaminated environment include monitoring to identify, those of risk, immunization of those at risk of communicable diseases like tuberculosis, chicken pox and others. The preventive measure for respiratory problems due to inhalation of chalk particles and particles from dust within the school environment should include sweeping and washing of the floor with disinfectant to be carried out at regular intervals daily. Retentive measures advocated also include taking regular breaks and resting appropriately to avoid loss of voice due to overuse.

Methodology

Certain Industries within Enugu Metropolis have been selected for this study. They include:

(i) Agriculture - crop and animal production, as well as farm mechanization (ii) Timber or wood processing - Masonry and carpentry (iii) Energy- electrical repairers, electrical power installers (iv) Construction - Structural iron and steel workers, roofers and metal fabrication, welding and soldering (v) Communications - Computer operators (vi) Transport - Bus truck operators, mechanics and transport attendants (vii) Education - teachers and instructors

In carrying out the study, the metropolis was divided into seven zones Asata, Achara Layout, Abakpa, Ogui, Ogbete, Uwani and Awkunanaw zones. The study was primarily based on survey research, in which data were collected through a cross section of the metropolis. A descriptive cross sectional survey design was used to observe the happenings to workers - work related illnesses and injuries - without any attempt to manipulate or control them.

The participants for the study were 1050 comprising males, and only 300 females in computer operation (Communication industry) and teachers (education industry). The participants were only five (5%) of 21,000 workers in the selected industries which form the population from which the sample was drawn. Inclusion criteria in the study were actual workers in the selected industries who have at least one year of working experience. Exclusion criteria were actual workers within the selected industries who cannot comprehend written English or Igbo language and supervisors in the selected industries who are not involved in the actual work.

Questionnaires were primarily used for collection of data. Personal interview was equally conducted. In using questionnaire in data collection, direct contact method of reaching the respondents was used. Closed form questionnaires were mainly used in which choices of possible answers to open questions were provided. However, open ended questions were equally used, which afforded the participants the opportunity to reveal their background or provisional conditions upon which their answers were based.

The descriptive statistics involving frequency distribution and percentage were used to analyse the data collected through the questionnaire. The data were first shown in tables and followed with interpretations (comments) in relation to the aim and objectives of the study.

Presentation and Analysis

Table 1 shows the industries and occupations in the industries, together with the respondents who compose the actual workers selected randomly from different zones in Enugu Metropolis. It comprises 150 workers from each industry who may show evidence of any of the compensable disease or predisposed illness or injury within the past 12 months. Also highlighted in the table is the hazard arising from work place that could impact on health and well-being of the workers.

Table 2 shows the percentage of various exposures among workers in the selected industries within the last twelve months.

Inhalation of cement dust was prevalent among truck operators and attendants in cement transportation (70%) in transport industry, and the cement dust were airborne because of their sizes. Vehicular emissions primarily affected diesel engine operators (72%).

Agriculture exposes farms to pesticide poisoning (75%). This is as a result of the extensive use of chlorine containing pesticides like DDI (Dichloride phenylchoroethans). Other hazards in agriculture are due to the multiple contacts with poisonous animals and plant that are biological agents, which give rise to allergies, zoonotic infections and parasitic diseases. Noise induced poor hearing, repetitive motion disorder, back disorders, stress and cold are also frequent. In Enugu, many waged workers found in market garden, Ministry of Agriculture are also involved in small-scale farming on family basis. Agricultural workers are dispersed in some areas of Abakpa Nike, Ugbo Ezeji, Ugbo Odogwu, along Asata and Ekulu rivers, Iva-valley and Emene. Here public services are insufficient and farming carried out in open air and in exposure to all types of weather. Besides, the workers suffer from technical backwardness, poor nutrition and sanitation systems, are exposed to endemic and occupational diseases and lack access to health care services. This is in conformity with the situation in Central America, where, according to valentine, agriculture was carried out in the country side as in Enugu metropolis under similar conditions and experiences.

In building and construction industries, virtually all the workers in the selected areas were exposed to at least one hazard, as shown

in Table 2. In Kenyatta and Nike Lake Timber sheds, the common hazards occur among mill operators while moving planks of wood into milling machines. Such includes moulder machines and timber stacking accidents.

The problem of noise was noticeable in construction; communication, building, transportation and education industries. Noise induced hearing loss is the most serious adverse health effect of noise and a compensable occupational disease. Besides, communication industry exposes the workers to repetitive motion more than any other industry, though this is well pronounced in all the industries. Also apart from noise, transport industry prominently exposes workers to cement dust, vehicular emission as well as vibration.

Roofers, especially, structural steel roofers are exposed to risk of working at heights, sometimes with unsafe scaffolding while working, rope grab and fall arrest for hand-free operation while descending and ascending. Roofers are also exposed to sun, often with no protection and are subjected to heavy radiant and convective heat load in addition to metabolic heat from physical labour. Heavy equipment, earth moving and other large mobile machine operators sit beside hot engine and work in an enclosed cab without ventilation. They are subjected to segmental and whole body vibration.

Consequently, findings from the study reveal that -in building and construction industries majority of workers work under extremely hazardous environment, without appropriate protective clothing. Use of personal protective equipment was poor and inappropriate. The workers were seen wearing their nose masks on their foreheads especially cement transportation attendants who described the equipment as being uncomfortable. Besides, though some of the welders interviewed were aware of the ocular protective property of the welder's goggles, yet only a few of them wear the goggles always. Also there is lack of effective training and encouragement of workers on proper use of other safety devices. Such as ear plugs, hand gloves, and inadequate training on the importance of safety knowledge. The workers also lack knowledge of consequences of negligence of these devices especially among the farmers.

The findings from the study also showed that there was no policy guidelines on safety precaution in each industry; water, oil and other chemicals spill on the workplace, there was absence of bill boards, posters, sign posters indicating danger zones, safety measures, unsafe zones and unsafe acts in workplace.

It was observed that workers were made to work with defective machines and equipment such as worn out hand tools. Then flying objects persisted due to improper design and shielding of machines resulting in unsafe working environment.

The hazards facing the workers were not perceived as priority in virtually all the industries studied. Owners of the industries and their managers did not provide sufficient fund for protective equipment. Indeed, the practice was to focus knowledge in production processes and profit at the expense of the safety of workers.

In most of the industries, workers were faced with combination of hazards. They were exposed to unguarded and noisy machines, hot temperatures and slippery floors all at the same time. It was like the workers were being made to adapt to the unsafe working environment.

From the findings in all the industries selected for the study, workers were exposed to noise-induced hearing loss - the most serious adverse health effect of noise. This relates well with the scenario in countries such as Zimbabwe and New Zealand where such condition exists.

Selected Industries	Occupations in the Industries within Enugu	Respondents (Actual workers)	Hazards to which Workers in the Occupations are Predisposed
Agriculture	Crop production	50	Noise induced hearing loss cancers, respiratory disorders, allergies, infectious and parietic diseases, stress, musculoskeletal disorders, backache, slips and falls
	Animal Production	50	
	Farm mechanization	50	
Building	Timber (Wood processing)	50	Heat stress, nose induced hearing loss, musculoskeletal disorders
	Carpentry	50	
	Mason	50	
Construction	Welders	37	Heat, stress, Lund and respiratory disorder, noise induced hearing loss, turns, slips and falls welding emissions, awkward postures, strains and sprains
	Structural steel workers	37	
	Roofers	37	
	Metal fabricators	39	
Energy/Power	Electricians	50	Slips and falls, electrocution shock, stress
	Electrical Power Installers	50	
	Repairers	50	
Communication	Computer Operators	75	Back pain and neck pain cataracts, repetitive stress/strain injury, Work related upper limb disorders, eye strain, migraines, headache, stress
	Computer Assistants	75	
Education	Teachers	75	Vocal cord disorders respiratory diseases musculoskeletal disorders, metal and neurological illness.
	Instructors	75	
Transport	Bus Drivers	50	Road traffic crashes, inhalation of vehicular emissions, stress
	Bust/truck	50	
	Mechanics	50	
	Diesel engine Operators	50	

Source: Field survey, 2014

Table 1: Distribution of respondents in selected industries and predisposed occupational Hazards; illnesses and injuries.

Exposures	Industries						
	Agriculture % Exposed	Building % Exposed	Construction % Exposed	Energy/power % Exposed	Communication % Exposed	Education % Exposed	Transport % Exposed
Cement dust	0	25	5	0	0	0	70
Fumes	0	10	5	0	0	0	75
Pesticide	75	5	10	0	0	0	0
Awkward motion	80	60	80	75	50	40	30
Cold	60	60	60	80	70	60	30
Heat	75	70	70	60	10	75	20
Noise	45	80	86	10	80	75	80
Repetitive motion	60	75	70	75	95	90	75
Stress	15	23	20	15	25	30	50
Vehicular emission	5	25	25	10	0	5	90
Vibration	0	80	40	0	0	0	60
Welding emission	0	65	70	0	0	0	0
Lifting & Pulling Movement	33	70	71	35	20	15	85
Slips & falls	25	30	32	33	5	10	10
Sharp metal objects	15	70	75	10	0	0	10
Bacterial infection	90	10	10	10	5	15	10
Parasites	86	5	5	5	5	10	5
Vermin snakes	56	5	5	10	0	15	5
Wood dust	0	95	5	0	0	0	0
Alcoholic use disorder	10	45	50	55	10	5	10
Assault	10	20	25	10	5	5	15
Drug use disorder	30	5	8	5	0	10	20

Source: Researcher's field work, 2014.

Table 2: Various exposures among workers in selected industries in Enugu within the past twelve months (%).

Workers were observed to have been exposed to a number of health hazards associated with their poor working environment especially in agricultural industry. They include heart diseases; musculoskeletal disorders especially back injuries or muscle disorders, allergies, bacterial infections and inhalations of vegetable pollen dust.

In the industries selected findings also showed that workers were exposed to varying degrees of stress. They include biomechanical stress, postural stress, mental stress as well as heat stress.

Recommendations

Employee safety is of utmost importance and should be accorded priority in all the industries. Hence, all industries should be made to provide medical care for their employees and the families through fully equipped on-site clinics in the industries.

There should be constant programme for extensive development of agricultural safety to address the high risk of injuries and illnesses experienced by Agricultural workers and their family members. Agriculture is ranked among the most hazardous industries and farmers are at high risk of fatal and non-fatal injuries. Since the state government recognizes the importance of agriculture and has a programme to develop it to highest level, the issue of safety of workers should be highlighted in the programme.

Employers should improve working conditions and organize seminars, education programmes and ergonomic interventions so as to ensure that workers remain healthy. This will reduce work-related illnesses which the National institute of occupational health and safety (1997) [11] related to work activities involving repetition, vibration, lifting, forceful movements, awkward postures, heavy physical load and static work postures.

There is need to increase awareness on safe ways of handling chemicals in particular. National Institute of Occupational Safety and Health approved toxic mask for workers in Chemical Industry. This should be fully enforced to safeguard lives.

An ergonomics survey should be conducted yearly and recommendations for improvement be made in each industry. This may entail change in the design and redesign of workplaces, facilities, tools and equipment for use by employees. Continuous coaching should be implemented to minimize musculoskeletal disorders.

Industrial hygiene survey should be carried out every year on all the industries location to ensure continued improvement, using the risk based management approach. This will focus on housekeeping, road Transport safety, energy isolation, occupational Wealth Risk Management, work at height, and consolidate on the progress made towards changing the safety culture mindset of workers.

Industries should get involved in the lives of the members of the communities in which they engage to build long term relationship. They should pioneer public enlightenment on personal health care, safe environment, road safety and effective waste management.

There should be appropriate education with emphasis on health implication particularly to construction workers. This is to address the barriers to utilization of protective goggles, and will centre on the welders inadequate appreciation of the constant necessity to wear goggles during every single welding procedure. This is essential because welders are at high risk of eye injuries as ascertained by a Canadian study which classified welding as representing 21% of all eye injury claims.

Wood workers, metal fabricators and structural steel workers appear not to be covered by appropriate national health and safety

standards. There is need for them to be guided by a comprehensive national policy dealing with safety issues. There is need for the various exposure levels to be measured and monitored and comprehensive criteria for collecting and analyzing data on workplace risk factors created. In line with this, managers and supervisors need to be trained and retained continuously in risk assessment to identify hazards.

Conclusions

Occupational hazards are preventable. Prevention of occupational hazards depends on the understanding that workers' safety is not only the responsibility of the workers, but is the primary responsibility of the employer. The employers need to train all their employees on the appropriate safety procedures and maintain safe working environment so that hazards are less likely to occur. Occupational hazard is not just the fault of the worker. It is the combination of unsafe work environment; insufficient safety training and negligible employee supervision that contribute to the hazardous circumstance. There is need that the employees address all the potential risk factors at the workplace and educate employees on safe work practices and risk awareness.

It is essential for workers to adhere to strict safety protocol and attend routine safety seminars that stress the importance of following safety guidelines. Employers should provide and encourage appropriate and effective use of lifting methods, proper use of fork lifts and cranes to load and unload heavy raw materials, employment of trolley to transport materials between stages of fabrication process, ensure that the ventilation systems work properly, and provide protection equipment such as respirators, eye ear guards and gloves where necessary.

Potentially hazardous machinery should be routinely inspected to ensure safety measures are in place and working properly. Tools should be properly chosen and suitably verified before use. Workplace should be brightly lit and extreme temperatures avoided, as well as suitable clothing for assignment tasks provided.

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