

MANAGING ERGONOMIC CHALLENGES IN THE MANUFACTURING INDUSTRY

Dr Olugbenga O. Bejide

*Dr Olugbenga Olukanmi Bejide is an occupational health physician , formerly the Brewery Medical Adviser of Nigerian Breweries PLC, Ibadan, Nigeria and now the Chief Consultant of JABULANI CONSULTS LIMITED

www.jabulaniconsults.com
olugbenga_bejide@yahoo.com

Abstract:

There is a robust interplay between the worker, the work and the workstation in the manufacturing industry either small, medium or large. The work environment comprises the physical, chemical, biological, ergonomic and psycho-social components each with its own group of associated hazards. The mechanical/ergonomic work environment has been further examined in respect of the challenges posed and how best to manage these challenges especially in the manufacturing industries where production targets are the main focus and the attendant risks can only be controlled and reduced to the barest minimum.

The hazards in the work environment including ergonomic hazards may not be completely eliminated or eradicated but definitely can be managed to the best of the situation in the interest of the worker's health and ultimately in the interest of the employer by way of improved productivity. The roles of the ergonomist as a manager of these ergonomic challenges have been examined in this paper.

A number of measures on how to manage these challenges have also been recommended thus making the worker, the employer and the society better for it. These measures include health education and awareness creation, engineering controls, administrative controls, environmental monitoring and factory inspection. Others include epidemiological monitoring, periodic medical examination, use of health and safety committees, promulgation of relevant legislations and practice of good housekeeping and standard operating procedures.

1. Introduction

The work environment comprises the physical ,chemical, biological, ergonomic and psycho-social components each with its own group of associated hazards. The mechanical/ergonomic work environment is being examined in respect of the challenges posed and how best to manage these challenges especially in the manufacturing industries where production targets are the main focus and the attendant risks can only be controlled and reduced to the barest minimum level rather than completely

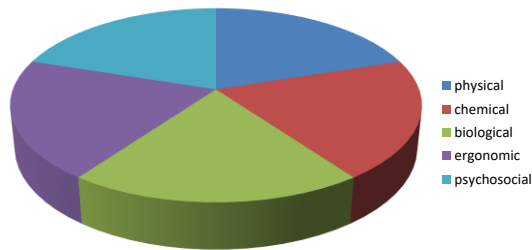
eradicated. Organisations, public and private, have been mostly grouped into two main groups

1) **service industry** like laundries, banks, finance houses and even the roadside artisans like car wash stands and the auto-electricians

2) **manufacturing industry** where actual processing of raw materials is done to add value leading to the production of various products (in various brands) like glass, beer, cement, soap, textiles and automobiles.

Bejide(2003) reported that more hazardous activities and tasks are undertaken in the manufacturing industry when compared with the service industry and these are the focus of this paper. The scenario examined includes production floors, workshops, laboratories and other workstations but excludes office computer systems. FIGURE 1:

THE WORK ENVIRONMENT AND
HAZARDS



2. Types of occupational hazards(4)

The various workplace hazards could be grouped into five categories:

- *physical hazards
- *chemical hazards
- *biological hazards
- *ergonomic hazards
- *psycho-social hazards

Physical hazards include noise, vibration, ionizing and non-ionising radiation, heat and cold. Some of these hazards can easily be perceived before damage is done. A notable feature of these hazards is that they are forms of energy. The impact can be felt but cannot be seen with the naked eye.

Chemical hazards are in the form of vapour, gases, fumes, mists, dust and not necessarily pharmaceutical chemical preparations. The main routes of entry of chemical hazards to

the human body are inhalation, ingestion and absorption before they can exert their toxic effects

Biological hazards include infectious agents such as bacteria, viruses, parasites, fungi and toxins associated with plants and animals. These also include pharmaco-active substances such as enzymes and hormones.

Ergonomic hazards refer to workplace conditions that pose the risk of injury to the musculoskeletal system of the worker and these include repetitive and forceful movements and awkward postures or positions that arise from improper work methods and improperly designed workstations, tools and equipment

Psychosocial hazards which include high job demands and low control of the job thus causing stress. Others include repetitive tasks, complex and highly demanding work requirements, unreasonable targets, shift work and job insecurity. Others are interpersonal conflicts, role ambiguity, low self-esteem, underutilization of skills, discrimination, inadequate supervision and gender and verbal violence (Clayton & Clayton;1998)

3. Ergonomics

Ergonomics or Human Factor Engineering is the skill of designing equipment and tools in the most operable way with the special consideration for space, comfort and adaptation to the user. The main purpose is to ensure correct man-machine relationships with emphasis on improved productivity, efficiency, safety and acceptance of the system by the user. The ergonomist needs contributions from other disciplines like industrial psychology, engineering, anthropology, anatomy and physiology.

4. Ergonomics stress factors

The debilitating, often fatal consequences of dangerous work conditions on man in various occupations have been well documented by several researchers in occupational health. Of the various sources of industrial health hazards, chief among them are ergonomic stress factors (Clayton & Clayton;1998). These include force, repetition, awkward postures, static postures, vibration, contact stress and environmental factors. The psychosocial component has also been found to play a dominant role (Bejide,2010)



FIGURE 2: ergonomic issue in a cloakroom

5. Benefits of ergonomics

The benefits of ergonomics can be many and include:

- *improved safety and health in the workplace
- *improved employee morale and job satisfaction(Oluwagbemi,2003)
- *improved productivity
- *improved quality of work
- *reduced probability of accidents and errors
- *reduced absenteeism and employee turnover(Kadiri,2004)
- *reduced medical and workers' compensation costs associated with cumulative trauma disorders

FIGURE 3: THE RISK OF WORKING AT HEIGHTS

6. Managing ergonomic challenges

1 health education and awareness creation

Most workers and members of the public need to be sensitized towards ergonomic issues as these will improve productivity and protect the health of the worker (Nwachukwu, 2000). In most cases the machines are designed and fixed for use in another work environment. And in situations where the machine has adjustable devices and controls, these may not be properly used. Consequently supervisors should endeavour to educate workers on the correct method of operation. It is also essential that when a worker is moved from one operation to another, he is suited to the job by adequate training (Asogwa, 1978). It must be borne constantly in mind that machine controls are, as it were, extensions of the body appendages. Correct lifting techniques should be explained to the worker.

The means of health education can vary from time to time and from one work situation to another. The manager or supervisor can talk to his workers regularly at the beginning of every task. Visually appealing posters and handbills can be made to convey these ergonomic messages. Video clips have been used in some instances with great impact and should be encouraged.

2 engineering controls

Engineering control measures should be addressed as the first line of defense to eliminate or reduce ergonomic hazards that employees are exposed to. It is important to design out the challenge when this approach is feasible. Most of the machines used in the developing countries have been built to suit the needs of workers in industrialized parts of the world. It is possible that some industrial accidents occur because there are discrepancies anthropometric measurements of the workers

Journal Prevention & Ergonomics; Vol:8, N°:3. Year: 2014, ISSN:1112-7546. EISSN:2676-2196

(Odukunle,2007). It is well known that Asians tend to have a smaller body frame than Caucasians. This challenge may not arise in the case of Negros who, by and large, are developmentally not very different from the Caucasians. The chances of such challenges arise when a machine designated for use in a location where the people are on the average of small stature is exported for use in a country where the people are generally bigger. A converse situation also creates challenges.

These controls, where possible, include adaptation of the machine for local use, fabrication and reinforcement. Height-adjustable workstations should be provided. For a fixed- height workbench, we need to provide work platforms to accommodate shorter workers and raise the work surface for taller workers. Sufficient leg clearance should be provided to allow the worker to get close to the work object thereby reducing the need to bend the torso. A footrest can be provided as foot support that will improve body balance and minimize the static load on the worker's back. Chairs and stools can be used to allow work in a sitting or standing position and arm slings in extreme cases can be used to reduce tension in the shoulder- neck area.

3 administrative controls

A number of administrative controls that can be used effectively are:

- ***Job enlargement** where employees perform more parts of a job rather than one specific task repeatedly

- ***Job rotation** where employees cross-train employees to perform other jobs thus rotating employees in jobs that use different muscle groups, if possible.

- ***Work breaks** should be encouraged whereby employees take frequent short breaks from repetitive tasks throughout the day

- ***Break exercises** lasting barely a few minutes should be encouraged to stretch out the various body muscles and remove strain

- ***Training and Re-training** of workers provides information for mitigating ergonomic hazards , strategies to improve a workstation layout and stress-reduction exercises

Many workspace components such as work surfaces , seats, floors, tools, equipment , environmental conditions and others determine whether or not the job is safe and healthy. Early intervention makes a difference for employees who experience symptoms such as pain, numbness, tingling, or tenderness in the fingers, hands or arms or muscle pains in the back, shoulders or other parts of the body from lifting or other body motions. It is important for employees to report early signs and symptoms of work-related musculo-skeletal disorders .

4 environmental monitoring and inspection Adequate monitoring and inspection of the work environment serves as essential tools towards maintaining healthy and safe working conditions

5 epidemiological monitoring is about using medical records to understudy work experiences in the industry thus help to throw lights on patterns of ergonomic challenges and the possible areas of focus

6 periodic medical examination in forms of periodic health assessment, pre-employment medical examination and pre-placement medical examination have been found useful in managing ergonomic challenges at work(Bejide,2010)

7 health and safety committees can be used to pursue ergonomic programmes as part of their health and safety responsibilities(ILO,2005)

8 legislation This is adaptation of the code and regulation governing the control of the hazards in the working environment. The Factory Act 1990 and other legislations and regulations to control workplace hazards have brought to bear the management of hazards in the work environment

9 standard working instructions/operating procedures are fundamental guides to doing things in the right way as approved by management. Standard Operating Procedures(SOP) must be developed for every key activity and strictly enforced. Any deviation from the SOP could lead to health and safety concerns.

10 good housekeeping is about a place for every tool and every tool having a place thus eliminating cause to improvise a working tool to the detriment of the worker's health and safety(WHO,1988)

7. Summary and conclusion

The hazards in the work environment including ergonomic hazards may not be completely eliminated or eradicated but definitely can be managed to the best of the situation in the interest of the worker's health and ultimately in the interest of the employer by way of improved productivity. The roles of the ergonomists as a manager of these ergonomic challenges have been examined. A number of measures on how to manage these challenges have also been recommended thus making the worker, the employer and the society better for it.

8. References

- 1 Asogwa S.E. (1978): *A Guide to Occupational Health Practice in Developing Countries*, Fourth Dimension Publishers, Enugu, Nigeria
- 2 Bejide O.O.(2003): Review of the Nigerian work environment, Medialite, Ibadan, Nigeria
- 3 Bejide O.O.(2009): An analysis of occupational diseases in a manufacturing setting(unpublished)
- 4 Bejide O.O.(2010): *Psychosocial Millieu of the Nigerian worker*, Jabulani Publishers, Ibadan, Nigerian
- 5 Clayton G.D. and Clayton P.E.(1998): *Patty's Industrial Hygiene and Toxicology*, John Willey & Sons Co. New York

- 6 Odukunle O.A. (2007): Fundamentals of Occupational Health and Wellness, Denik & Associates Publishers, Lagos, Nigeria
- 7 Oluwagbemi B.F. (1987): Basic Occupational Health and Safety, Vertex Media Limited, Ibadan, Nigeria
- 8 Oluwagbemi B.F. (2003): Themes and Issues in Occupational Health and Safety, Hune Publishers, Ibadan, Nigeria
- 9 ILO(2005): Safe Work Program on Safety, Health and Environment, Geneva
- 10 Kadiri S.A. (2004): Safety Handbook for Engineering and Allied Professionals, Zub-Chord Publishers, Lagos, Nigeria
- 11 Nwachukwu A.E. (2000): Industrial and Occupational Health and Safety, Totan Publishers Limited, Owerri, Nigeria
- 12 WHO Technical Report Series 765(1988): Health Promotion for working population.

