

Importance of Ergonomics: An Emerging Issue for Occupational Health in Bangladesh

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ABSTRACT

Occupational health is specifically concerned with safety and wellbeing of the workers, as well as its motive is to improve productivity, using optimum level of human cost comparing the productivity outcome. In normal circumstances, occupational stress appears as an unavoidable part of working life.

Neglect of occupational stress and safety may result in unseen burden to the economy, which, in some cases, may be significant major occupational hazards concerning work motivation and quality productivity. This issue is considered under the concept of fitting the working environment and tools to human comfort and productivity—scientifically called Ergonomics. This fact has not been accepted by many industrial organizations. Lack of understanding of the concepts of ergonomics and the roles of its principles for designing a realistic approach in improving awkward posture, and force leading to developing early fatigue and work place acquired health problems. this article discusses and describe the importance and impact of occupational safety in terms of ergonomics.

Key words: Occupational health, occupational safety, productivity, Ergonomics

INTRODUCTION

Occupational health is specifically concerned with safety and wellbeing of the workers, as well as its motive is to improve productivity, using optimum level of human cost comparing the productivity outcome. In normal circumstances, occupational stress appears as an unavoidable part of working life.

A strong relationship exists between the occupational stress of workers and their productivity. Occupational stress of the workers results in reduced production due to inefficiency of the workers and sickness absenteeism. Moreover, the workers have to be paid sickness benefits and compensation wherever applicable. In many cases workers have to face the loss i.e., no work no pay.

Neglect of occupational stress and safety may result in unseen burden to the economy, which, in some cases, may be significant major occupational hazards concerning work motivation and quality productivity. The most commonly occurred work related

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occupational stress musculoskeletal disorder are found in upper extremities, and neck-back, and have been described by a number of generic terms including cumulative trauma disorders, work related upper limb disorders, occupational over use syndrome, etc. This issue is considered under the concept of fitting the working environment and tools to human comfort and productivity—scientifically called Ergonomics. Ergonomics is very important concept for enhancing human productivity.

Objective of this discussion is to describe the importance and impact of occupational safety in terms of ergonomics.

LITERATURE REVIEW

(Bhattacharyya and Chakrabarti 2016)Ergonomics is an emerging concept in our country compared to its development in the west. It is still an emerging area with heterogeneous nature of research and practices in different spheres of technological needs A strong relationship exists between the comfort and productivity. Unfortunately, this fact has not been accepted by many industrial organizations. This is an indication of lack of understanding of the concepts of ergonomics and the roles of its principles for designing a realistic approach in improving awkward posture, and force leading to developing early fatigue and work place acquired health problems.

(McCormick and Saunders 1993)The term "ergonomics" is derived from two Greek words: "ergon," meaning work, and "nomoi," meaning natural laws. Ergonomists study human capabilities in relationship to work demands. "Ergonomics applies information about human behavior, abilities and limitations and other characteristics to the design of tools, machines, tasks, jobs and environments for productive, safe, comfortable and effective human use".

(Dul et al 1993) A number of factors play a role in Ergonomics; these include body posture and movement (sitting, standing, lifting, pulling and pushing),and environmental factors (noise, lighting, temperature, humidity).

PROBLEMS

Ergonomics: (The Study of Work, 2000, U.S. Department of Labor Occupational Safety and Health Administration) Industries increasingly require higher production rates and advances in technology to remain competitive and stay in business. As a result, jobs today can involve:

- Frequent lifting, carrying, and pushing or pulling loads without help from other workers or devices;
- Increasing specialization that requires the worker to perform only one function or movement for a long period of time or day after day;
- Working more than 8 hours a day;
- Working at a quicker pace of work, such as faster assembly line speeds; and
- Having tighter grips when using tools.

These factors—especially if coupled with poor machine design, tool, and workplace design or the use of improper tools—create physical stress on workers’ bodies, which can lead to injury.

If work tasks and equipment do not include ergonomic principles in their design, workers may have exposure to undue physical stress, strain, and overexertion, including vibration, awkward postures, forceful exertions, repetitive motion, and heavy lifting. Recognizing ergonomic risk factors in the workplace is an essential first step in correcting hazards and improving worker protection.

Work-related musculoskeletal disorders (MSDs) occur when the physical capabilities of the worker do not match the physical requirements of the job. Prolonged exposure to ergonomic risk factors can cause damage a worker’s body and lead to MSDs.

THE IMPACT OF ERGONOMICS

(Ergonomics: The Study of Work, 2000, U.S. Department of Labor Occupational Safety and Health Administration)The goal of Ergonomics is to provide maximum productivity with minimal cost; in this context cost is expressed as the physiological or health cost to the worker. In a workplace setting there are seldom a large number of tasks that exceed the capabilities of most of the workforce. There may be jobs that will include a specific task that requires extended reaches or overhead work that cannot be sustained for long periods, by using Ergonomic principles to design these tasks; more people should be able to perform the job without the risk of injury.

Ergonomics has already been defined and its primary focus is on the design of work activity that suits the person in that it takes account of their capabilities and limitations. Matching the requirements of a job

with the capabilities of the worker is the approach to be adopted in order to reduce the risks of musculoskeletal injuries resulting from handling materials manually.

Ergonomics emphasizes the prevention of work related musculoskeletal disorders through recognizing, anticipating and reducing risk factors in the planning stages of new systems of work or workplaces. In effect, to design operations that ensure proper selection and use of tools, job methods, workstation layouts and materials that impose no undue stress and strain on the worker. Additional costs are incurred in redesigning or modifying work processes therefore it is more cost effective to reduce risk factors at the design stage. A proactive approach to Ergonomics will ensure that:

-Designers will receive training in ergonomics and have appropriate information and guidelines regarding risk reduction

-Decision-makers planning new work processes should have knowledge of Ergonomics principles that contribute to the reduction or elimination of risk.

-Design strategies emphasize fitting job demands to the capabilities and limitations of workers. For example, for tasks requiring heavy materials handling, use of mechanical assist devices to reduce the need for manual handling would be designed into the process

-Other aspects of design should be considered including load design, layout of the workplace to allow for ease of access when using mechanical aids and eliminating unnecessary lifting activities.

Recommendations:

RECOMMENDATIONS

Ergonomic principles provide possibilities for optimizing tasks in the workplace.

(Fernandez and Goodman,1990) Some ergonomics principles that should be applied to the workplace, whether in an industrial or an office environment, include the following:

(1) Aim at dynamic work, avoid static work (work where there is no movement). Static work or static

loading of the muscles is inefficient and accelerates fatigue. Static work can occur when the workplace is too high or too low, when holding a weight in one's arms for an extended period, or when there is constant bending of the back to portfolio a task.

(2) Adjust work surface heights to the size (anthropometry) of the worker and the type of task performed (precision, light assembly, or heavy manual).

- (3) Work within 30 per cent of one's maximum voluntary contraction (strength). Avoid overloading of the muscular system.
- (4) Place primary controls, devices, and work pieces within the normal working area. Secondary controls should be placed within the 'maximum working area so as to reduce extended reaches and fatigue.
- (5) Strive for best mechanical advantage of the skeletal system.
- (6) Work with both hands. Do not use one hand (non preferred hand) as a biological holding device.
- (7) Hands should move in symmetrical and opposite directions.
- (8) Use the feet as well as the hands.
- (9) Design knowing the capacity of the fingers. Do not overload the fingers.
- (10) Use gravity. Do not oppose it to dispose of unbreakable products.
- (11) Avoid unnatural posture. Bend the handle of the tool. not the wrist.
- (12) Permit change of posture. Maintain a proper sitting posture.
- (13) Counter-balance tools when possible to reduce the weight and forces.
- (14) Accommodate the large individual and give him or her sufficient room.
- (15) Use bins with lips for storage and manual retrieval of small parts instead of boxes. Incline containers so as to reduce awkward postures of the body.
- (16) Train the individual to use the workplace, facility and equipment properly.

(Ergonomics: The Study of Work, 2000, U.S. Department of Labor Occupational Safety and Health Administration)The goal for the design of workplaces is to design for as many people as possible and to have an understanding of the Ergonomic principles of posture and movement which play a central role in the provision of a safe, healthy and comfortable work environment. Posture and movement at work will be dictated by the task and the workplace, the body's muscles, ligaments and joints are involved in adopting posture, carrying out a movement and applying a force. The muscles provide the force necessary to adopt a posture or make a movement. Poor posture and movement can contribute to local mechanical stress on the muscles, ligaments and joints, resulting in complaints of the neck, back, shoulder, wrist and other parts of the musculoskeletal system.

According to International Ergonomics Association Cognitive ergonomics is concerned with mental processes, such as perception, memory, reasoning, and motor response, as they affect interactions

among humans and other elements of a system. Relevant topics include mental workload, decision-making, skilled performance, human computer interaction, human reliability, work stress and training as these may relate to human-system design. This should be applied universally [International Ergonomics Association (2016) Definition and domains of ergonomics¹].

Ergonomists, industrial engineers, occupational safety and health professionals, and other trained individuals believe that reducing physical stress in the workplace could eliminate up to half of the serious injuries each year. Employers can learn to anticipate what might go wrong and alter tools and the work environment to make tasks safer for their workers.

Work related discomfort and pains are a major occupational health problem amongst the workers in industries. Controlling these problems by using ergonomics begins with identifying exposure to the known risk factors through an on-site assessment of the work being performed. The ergonomics problem-solving technique leads the user through the identification of ergonomic risk factors by body parts first. By generating multiple reasons, each risk is evaluated by asking why it is present. Strategies are generated to reduce the risk; specific short-term and long-term solutions are developed. The preferred solution may be the one that improves the ergonomics of the job and reduces the risk for injury substantially at a relatively low price.

(Bhattacharyya and Chakrabarti 2016) Work related risk factors in development of work related body pains can be reduced, even be avoided with ergonomic interventions. This can be achieved by identifying the risk factors in the activity and finding the proper solution with design intervention. For user friendly design, if participatory ergonomics approach is taken into consideration for design development process, the results become fruitful.

CONCLUSION

(Jeffrey E. Fernandez and Michael Goodman) Recognizing the importance of ergonomics in occupational health and safety, it is worthy to setup ergonomics standard. The standard will affect a wide-ranging sector of American business and industry, from heavy manufacturing to office settings. The proposed standard identifies six elements for a full ergonomics program: management leadership and employee participation, hazard information and reporting, job hazard analysis and control, training, MSD management and program evaluation. The ergonomics programs should be job-based,

i.e., cover just the specific job where the risk of developing an MSD exists and jobs like it that expose other workers to the same hazard.

Recent developments in the regulatory arena clearly show that understanding of ergonomics and applying good ergonomic practices is key to successful management of human resources. Many companies are realizing that making ergonomic changes before major problems occur (proactive ergonomics) is more cost effective than simply responding to work-related injuries (reactive ergonomics).

Ergonomics is no longer just a buzzword; it now encompasses every aspect of our lives both at work and at home.

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