



Ergonomics and Employees' Performance

Mustafa Maballaghi, Niku Salimi, Nader Nasirnejad

¹Assistant Professor, dept, of Industrial Management, Faculty of Management & Accounting, Karaj Branch, Islamic Azad University Karaj, Karaj, Iran

²Assistant MBA, dept, of MBA, Faculty of Management & Accounting, Karaj Branch, Islamic Azad University Karaj, Karaj, Iran

³Assistant MBA, dept, of MBA, Faculty of Management & Accounting, Karaj Branch, Islamic Azad University Karaj, Karaj, Iran

Abstract: Ergonomics is always trying to create an effective, safe, and convenient workplace. Effective application of ergonomics in the design of the system can provide balance between jobs and characteristics of the employees. This can lead to labor force productivity, increased safety, physical and mental well-being, and job satisfaction of the employees. On the other hand, performance is doing works and tasks properly and rightly or spending the least amount of time or energy for the greatest work done. If an organization can achieve to certain goal with spending less resources compared with other organizations, it is said that it has higher performance. Increased productivity enhances efficiency and it helps in achieving organizational goals. Joyce Marilyn Joyce, President of the Institute in Seattle in USA believes that companies considering performance and quality control should employ ergonomics in their plans, as commercial intuition. Successful companies have integrated ergonomics plan with safety, quality control and production plans to maximize the performance. In this paper, we examine ergonomics and employee performance.

Keywords: ergonomics, performance, organization, employee, human factors

Introduction

Ergonomics is always trying to create an effective, safe, and convenient workplace. Effective application of ergonomics in the design of the system can provide balance between jobs and features of the employees. This can lead to labor force productivity, increased safety, physical and mental well-being and job satisfaction of the employees. Nowadays, as structure and performance of organizations become complex, organizing the workplace and creating a relaxed and productive atmosphere in organizations leading to activation of more human force, their vitality, reduced risks, increased quality at work, reduced depression, growth of services and ultimately desired productivity are the main concerns of CEOs and heads of organizations. The results of the studies related to human forces show that the development of productive human forces is directly involved in achieving many of the goals in the organization. A good environment can affect the growth of personnel values and increasing their productivity. For this reason, science of human management or ergonomics has great importance for organization's managers and leaders. Ergonomics or human factors engineering is combined science that is trying to design tools, devices, work environment and jobs with respect to physical, intellectual capabilities, limitations, and human interests. This science has been developed to increase productivity in light of health, safety and welfare of man in the environment. Organization's access to knowledge of ergonomics, especially in developing countries, is difficult. Therefore, promoting knowledge level for application of ergonomics in order to improve working conditions and productivity is essential. This is very important and fundamental for developing country's industries, especially Iran, requiring applied research in the field of learning in practice. In this paper, we examine ergonomics and employee performance:

Theoretical principles

Ergonomics

Ergonomics or human factors engineering is combined science that is trying to design tools, devices, work environment and jobs with respect to physical, intellectual capabilities, limitations, and human interests. This science has been developed to increase productivity in light of health, safety and welfare of man in the environment. In addition, this science is trying to adapt environment with human rather than adapting human with environment. In this regard, ILO (international labor organization) has defined ergonomics as making labor and job adaptable with humans. This knowledge is used to design and build tools and production systems, ranging from simple to complex, solving the problems related to new technologies, and tools and everyday life applications. Ergonomics is used today in wide areas ranging from designing a simple tool such as simple pliers (in terms of kind, materials used, size of handle, plastic type and composition of its handle) or pen (in terms of diameter, size, and color) to designing a complete production system.

Ergonomics goals:

The essential goals of ergonomics are improving the procedure of performing works and tasks, tools of work and adapting them with human mental and physical features. However, it should be noted that by observing ergonomics principals, undue working pressure and fatigues are reduced. In addition, it is looking for scientific adapting of job, conditions, tools and work environment with physical characteristics of human and determining its physical strength. Task and work environment should be designed in a way that it can be adaptable with mean physical characteristics of people by considering related standard deviations.

Ergonomic dimensions:

Ergonomic dimensions include:

- Work Physiology: A part of ergonomics knowledge considering the adaptation of human with work in energy consumption as well as body physiological parameters changes during the performing the work or task known as work physiology.
- Occupational biomechanics: in biomechanics, physical laws of mechanics are used for body. By application of these laws and rules, it is made feasible to calculate local mechanical pressure exerted on the muscles and joints during special status in the body and its movement.
- Engineering psychology: it deals with physical and chemical environmental factors such as noise, vibration, light, weather and chemicals that may affect safety, health and comfort of people.
- Anthropometry: it involves collecting and interpreting data related to the size and shape of the human body dimensions (longitudinal, transverse, environmental and weight dimensions). Anthropometric is defined systematic measurement following use of measuring devices.

Ergonomics from organizational perspective:

From an organizational perspective, ergonomics causes productivity, increased production, increased efficiency and prevention from absenteeism and fatigue at work if implemented at all organizations. Thus, it increases national income of countries. Consider an employee who works 8 hours per day and sits behind a desk all time working with computer. After two hours, neck vertebrae, especially the second one, becomes so painful so that he moves his neck backward with pain and difficulty. This pain causes that a person to abandon his work for a while and each time that he starts to work, his accuracy in the work is reduced and he feels fatigue. However, if his computer desk and chair to follow principles of this science, it can be said that his fatigue has been reduced and his efficiency increases. Additionally, when he stands up after some hours of working to perform exercise, his working will be easier and his fatigue will be reduced. If we consider such situation for manager of an organization or factory, it will be even worse and critical. Suppose a person who has been injured after a period of working without the use of mechanisms of this science in his workplace, and he had to rest at home. It cannot be said that factory is paralyzed at this time, but it will not have efficiency than before. However, if the manager or head of Technical and Professional Organization worked in a factory in which ergonomic principals have been implemented at all aspects, he would have been able to work with higher efficiency without feeling fatigue and tiredness. This science has proven that we can perform tasks and works with lower pressure. In other words, we can reduce undue pressures.

Implementing ergonomics in organizations

- Management leadership and employee participation:

Employees must report their injuries and announce their proposals and management should respond to what people want.

- Notification and identification of risk:

Management should recognize occupations or jobs and provide the necessary information about its employees.

- Analyzing and controlling occupational risks:

The organization should identify jobs that put people at risk of musculoskeletal disease and create necessary reforms in them.

- Training

Employees should become familiar with their job's ergonomics and work-related musculoskeletal complications and ways of controlling them.

- Medical Management:

Organizing employees with work-related musculoskeletal complication

- Ergonomics plan evaluation:

Ergonomics plan should be reviewed and updated periodically.

The definition of employee performance in an organization:

Each person requires knowledge and information of his position for progress and achieve to pre-specified occupational goals. This knowledge causes that he is informed of his strengths and weaknesses in performance and behavior and take necessary steps to increase efficiency of his work. Organizations also need knowledge of their employees' efficiency and performance to improve their human resources based on it. Accordingly, they can increase their volume of services and create positive development in their activities. According to one of the Islamic philosophers, an organization can survive and produce desired effect when it is harmonious, or when there is balance and justice among each component quality.

Performance measurement and evaluation requirement

Experts and researchers believe that performance is the main subject at all organizational analyses and it is difficult to imagine an organization without evaluation and measurement of performance. Experts and researchers state that paying attention to subject of organization performance increases theoretical development of organization and they claim that performance is the main subject in the scientific space. Therefore, it has attracted the attention of researchers in the areas of organization and management and political science, economists, and executive managers. Evaluation and measurement of performance lead to intelligent system, motivated people to show appropriate behavior, and the main part is development and implementation of organizational policies. Evaluation and measurement of performance provide necessary feedback in the following cases. By following the level of progress towards specified goals, it is determined whether developed policies have been successfully implemented. By measuring organizational expected results as well as employee and customer satisfaction measurement, it is determined whether the policies have been developed correctly. In addition, systems supporting performance and performance management develop incentive mechanisms promoting organizational learning and knowledge in the following ways:

- Providing indicators of organizational growth

- Identifying improvement points

- Flourishing employees' talent

An executive system has good performance when its performance is measured. It requires performance and learning measurement that can assist organizational development and identify organizational growth characteristics, effective improvement, and continuous improvements. Measurement system will be able to identify individuals and teams to measure goodwill of employees on goals of executive system and to enhance their confidence and competence.

. Ergonomics role in employees' performance

Performance is doing works and tasks properly and rightly or spending the least amount of time or energy for the greatest work done. Efficiency is defined as the amount of resources consumed to produce one product and it can be calculated in terms of consumption to product ratio, or the ratio of the amount of work done to the amount of work that must be done. If an organization can achieve to certain goal with spending less resources compared with other organizations, it is said that it has higher performance. Increased productivity enhances efficiency and it helps in achieving organizational goals.

Joyce Marilyn Joyce, President of the Institute in Seattle in USA believes that companies considering performance and quality control should employ ergonomics in their plans as commercial intuition. Successful companies have integrated ergonomics plan with safety, quality control and manufacturing applications to achieve the maximum performance (1997).

According to Sadeghi (2000), ergonomics science was developed by integration of biological sciences, human physiology, systems and methods, design of jobs and work environment to increase performance and

effectiveness. It has been developed with regard to health, safety and welfare of employees at work environment.

Dennis (1996) considers human factors engineering (ergonomics) as design of a systematic process for human trying to use human knowledge in line with equipment that he uses, environment where he works, functions that he performs, and it guides management system in line with safety and increasing the performance and efficiency. In a study entitled "The relationship between ergonomics and quality of services provided for customers in branches of Agricultural Bank", Sharee et al (2008) concluded that correctly using of ergonomics principles leads to increased performance of employees. In a study entitled "Redesigning of environment and processes to increase safety and productivity," Tavakkoli Moghaddam et al (2008) concluded that if we consider health of labor force in the work environment, individual and organizational performance and effectiveness would be increased. In a study entitled "Ergonomics, safety and productivity," Kanani et al (2008) concluded that when ergonomics technology is applied properly, it might eliminate or reduce injuries and occupational health and safety problems in the workplace and increase job satisfaction and efficiency.

Discussion and conclusion

Lack of attention to ergonomic principles and lack of observing them in the workplace will impose very high costs for the employer and employee. It also will reduce efficiency and increase the stress of employee. If the ergonomic technology to be applied properly, it can eliminate or reduce injuries and occupational safety and health problems in the workplace and increase efficiency. However, it is not considered so much in designing. Ergonomic principles can reduce employee stress. The highest correlation was found between engineering psychology and job stress. Most of companies have necessary ergonomic devices, while employees are not aware of properly using of them. Due to lack of awareness of some managers and employees of ergonomic importance, it is better that in addition to providing workplace compatible with ergonomic principles, necessary trainings required in this area to be given for people. Observing ergonomic principles is related to employees and we cannot force them to observe these principles. However, employees can be motivated to observe these principles. Since most of employees spend their time on computer and back of desk, so it is recommended that managers to provide necessary time for exercise, break and job rotation for employees. Although several studies have been conducted regarding the use of participatory ergonomics in developing countries, including Iran, less studies have been conducted in this regard. Considering ergonomic principles in work not only maintains health of human force in human societies, but also prevents imposing much financial costs on the economy of countries and reduced efficiency.

References

1. Tavakoli Moghadam, R, Taghavifar, MT, Amouzadeh Khalili, H, Khosroshahi, S, (2008), redesigning the environment and procedures to increase safety and productivity, the first international conference on ergonomics
2. Joz-e Kanani, M, Mortazavi, SB, Khanin, A, Asilian, H., (2008), ergonomics, safety and productivity, First Ergonomics International Conference in Iran.
3. Sharee, Z, Kazemi, M., (2008), examining the relationship between ergonomics level and quality of customer service in all branches of the Agricultural Bank, First International Conference on Ergonomics
4. Omidvari, M., (2011), investigating the effect of safety plans on indicators of accidents and occupational diseases in food industries of Ilam province in a five-years period, Health Magazine
5. Karsh, b, (2013), Barriers to the adoption of ergonomic innovations to control musculoskeletal disorders and improve performance, Applied Ergonomics, Volume 44, Issue 1, January 2013, Pages 161–167
6. Stekel, j , (2013), Development without energy? Assessing future scenarios of energy consumption in developing countries, Ecological Economics, Volume 90, June 2013, Pages 53–67
7. ILO. Ergonomics Checkpoints, Practical and easy-to-implement solutions for improving safety, health and working conditions. Geneva, International Labour Office; 2010: 1-280.

8. Helali F, Lönnroth, EC, Shahnavaz H. Participatory ergonomic intervention in an industrially developing country—a case Study. *International Journal of Occupational Safety and Ergonomics (JOSE)*. 2008; 14(2): 159-76. <http://www.ciop.pl/26621>
9. Shengli Niu. *Ergonomics and occupational safety and health: An ILO perspective (Applied Ergonomics)*, 2010; 41(6): 744-53.
10. Reg Revans, *Action Learning in practice 4th Edition*, Gower publishing company, 2011: 11.