

ERGONOMICS OR HUMAN FACTORS– NEED OF THE HOUR

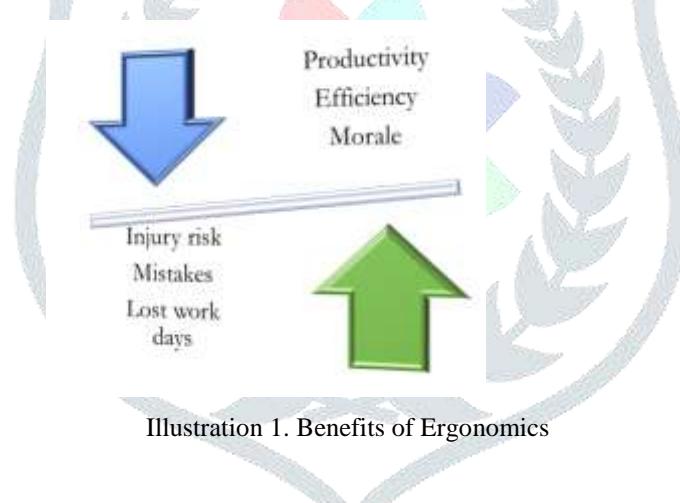
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Are you tired of having a sore back, shoulder pain, headache such other physical problems and fatigue by the end of the workday? Habits formed in our daily activities like sitting in a chair, staring at a screen, tapping on a keyboard, cradling the phone, slouching in a chair, or even while doing any household handled activities are physically demanding tasks. These conditions cannot be eliminated, but can be helped by incorporating appropriate good ergonomic techniques into daily routines and work sites which we will discuss in the following text.

The word ergonomics is derived from the two Greek Words ‘ergon’ (work) and ‘nomoi’ (laws). These Greek words in combination literally mean ‘laws of work’. The laws always provide a discipline that causes the best quality of the product/work. So every worker needs to follow work-laws which ultimately affect health and protection created while doing the work which is essential for all human beings in various types of activities such as pulling, pushing, carrying, manual material handling, assembly line, computer work, etc. According to OSHA (1994), ergonomics is the study of "planning the activity to fit the labourer, instead of driving the specialist to fit the activity." In other words, ergonomics is about making jobs easier and comfortable in reducing the risk of physical injuries and at the same time gives the satisfaction of completing the task with good results and making the best products.

It is essential for people to become aware of the necessity of incorporating ergonomics into their everyday lives. Industries should provide height-adjustable desks, chairs, working tools & equipment, and proper workstation design. There is a multitude of reasons why ergonomics should be implemented in the industries, leading to benefits for both the employer and the employee. It is important to see the benefits in ergonomics for all facets of the factory on the floor in the following illustration 1.



In any industry, a job involves –

- pulling, pushing, lifting, and carrying requires workers to perform various tasks
- working continuously without taking any micro breaks or rest in between,
- working at a quicker pace of work such as faster assembly line and
- having tight grip when using tools.

When these factors especially if coupled with-

- a. poor machine design b. poor tools, c. poor workplace design d. physical stress on worker's bodies than it causes physical injuries especially Work-related Musculoskeletal Disorders (WMSD's). Musculoskeletal disorders represent one of the leading causes of occupational injuries often is grouped with repetitive strain injuries (RSIs) and cumulative trauma disorders (CTDs).

Musculoskeletal Disorders (MSDs) are injuries and disorders that affect the human body's movement or musculoskeletal system, i.e. muscles, tendons, ligaments, nerves, discs, blood vessels, etc. High repetition, excessive force, and awkward postures are the major cause of MSDs in an industry. Work-related Musculoskeletal Disorders happen when the physical capacities of the worker do not coordinate the physical prerequisites of the activities. Most of the researchers agreed that exposure to ergonomic risk factors are a major cause of these injuries. In a 2000 survey of Occupational Injuries and Illnesses, the Bureau of Labor Statistics (BLS) reported that skilled workers who suffered from a musculoskeletal disorder (MSD) injuries lost an average of 19 workdays. Of all injuries resulting in lost workdays, 257,900 were ergonomically related and 44 percent were caused by bodily movements or exertion. (<https://www.thefabricator.com/thefabricator/article/safety/ergonomic-injuries-and-the-workplace>)

India is a highly populated country in the world, so industries get workers easily at a lower cost. Many industries work is repetitive and monotonous requiring strong visual demands, improper postural requirements, involving long hours sitting or standing in one position. Factors such as repetition, force, posture, and vibration are associated with higher rates of physical injuries. But one should not look at the workstation alone to understand these injuries.

The work environment in a majority of the industries could be unsafe and unhealthy which includes-

- poorly designed workstations,
- well lit and proper light sources at workstations are to be taken into consideration.
- use of inappropriate tools,
- furniture not in good conditions such as chairs which have not the appropriate height of workers,
- when working in a standing position the floor surface is very important to the comfort of the worker and may influence the risk of injuries.
- uneven floor surface creates hassle in some assembly tasks performed from a standing position.
- care should be taken at shiny surfaces that reflect light or task lights that shine directly into the operator's eyes which create glare.
- due to unsuitable tables, one has to compromise the posture of the upper extremity and neck,
- without back (lumbar) support where operators face a substantially higher risk of muscle pain and injuries,
- machines which require the excessive reach of operators can create back & knees pain,
- limited legroom space because of drawers attached to the underside of the table, etc.

The risk of injuries is not limited to the shop floor workers. An increasing number of MSDs relate to computer users by extending the use of computer keyboards. As static as it may seem, many computer users usually experienced pain in neck, shoulder, elbow, forearm, wrist and back while continue writing, designing or any of the other computer-centric activities.

Ergonomic risk factors are aspects of a job that may cause biomechanical stress on the employee, such as highly repetitive tasks, awkward postures, and forceful exertions into the body part. Exposure to one or more ergonomic risk factor could cause to MSDs. The symptoms of MSDs include recurrent pain, stiff- joints, shooting pains, swelling, dull aches, and loss of strength.

Francis, J.R., et.al, (2019) has focused on the main five ergonomics risk factors by the department of Employment and Industrial Relations.

1. Forceful Exertions which include the quantity lab or lifting, how pushing, pulling, or using excessive force to perform tasks, these tasks which required forceful exertion place higher loads on the muscles, joints, ligaments, and tendons.
2. Repetition which is rehashing a similar development through the work day (how frequently the business plays out the undertaking), Repetitive activities as a hazard the factor can likewise rely upon the body zone and explicit the act being performed.
3. Awkward postures the body position figured out which muscles and joints are utilized in a movement and measure of power used(spinal plates open to more pressure while lifting substantial the article, different undertakings requiring rehashed or supported twisting of the wrists, knees, hips, or shoulders additionally increment weight on these joints).
4. The vibration happens when a particular piece of body contact with the vibration instruments like working hardcore vehicles or expensive apparatus.
5. Duration the measure of time the individual is constantly open to hazard factor, and utilizing a similar muscle or movement increment the likelihood of WRMD.

When ergonomic risk factors are ignored, they often lead to musculoskeletal disorders. To avoid these risk factors best ways to control the onset of musculoskeletal disorders in the workplace is with ergonomics. Illustration 1.2 shows the hierarchy risk factor controls.



Illustration 2. Hierarchy of Controls

(<https://www.safetyandhealthmagazine.com/articles/16790-the-hierarchy-of-controls>)

Table 1. Following table shows a brief description of Control Methods for Ergonomics Issues

Elimination	Substitution	Engineering controls	Administrative controls	Personal Protective Equipment (PPE)
Elimination is at the top of the graphic and is usually much more effective and protective than those at the bottom. This is the preferred method and the most effective solution. One has to eliminate the hazard at the source.	Substitution means to replace the hazard if elimination is not possible. Consider substituting or replacing the known hazard with an appropriate material, process, or equipment that is less dangerous.	Engineering controls involve denying access to the hazard by installing physical barriers. It is more effective than administrative or PPE controls, if well implemented.	At the point when the introduction to the health hazard is not, or be limited by different methods, people ought to acquaint safe work practices with decrease the hazards.	Though Personal Protective Equipment (PPE) has limited effectiveness in controlling ergonomic hazards, introduce it to increase protection and when other measures are not possible.

According to the above presentation, to reduce work-related ergonomic injuries, one has to understand an ergonomic analysis program to measure risk for each job, identify, implement, and continually evaluate the results of the process required. Furthermore, to prevent injuries include; communication, the involvement of employees in decision making, education, and training of employees and management on prevention strategies. To wrap up with a note that, a successful ergonomics program adapts job tasks to fit the worker and eliminates work conditions that put a harmful strain on the worker's body as well as mental capacity.

References:

Francis, J.R., Deepan G., (2019), "A study of plausible ergonomic risk factors in construction industries and its effective remedial measures", IJRET: International Journal of Research in Engineering and Technology, 3(11), 7106- 7109.
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