

# Safety, health and environmental risk

[Environment](#), [Ecology](#)



For most people, the words safety, health and environmental risk would automatically be synonymous with occupations involved in industrial and mechanical factories, chemical labs, or construction sites. Although these factors may be more common in such work settings, the truth is safety risks and hazards also exist in a regular office or work place. The risks however, manifests in the form of biomechanical-related stress and injuries. This includes lower back injury, carpal tunnel syndrome, and repetitive strain injury among many others.

Such types of physical stress can result to fatigue and pain which may then cause the worker to perform poorly and even be unproductive. This paper will discuss various types of biomechanical and ergonomics-related injuries in the workplace. It will also tackle the causes as well as their negative effects on the workers. Consequently, this paper also aims to give recommendations on how to effectively and efficiently address this problem. A regular work desk at a typical office may seem like a hazard-free and safe work environment.

However, several studies showed that prolonged and sustained work posture may result to various musculoskeletal disorders. Injuries include repetitive strain injury, carpal tunnel syndrome, and cumulative trauma disorder among many others. In fact, Bureau of Labor Statistics report that cases of ergonomic disorders are now rapidly growing in figures. According to researches, occupational illnesses as well as musculoskeletal disorders increased from 18 percent in 1985 to a staggering 56 percent in 1991 (University of Maryland 2008).

Today, these numbers continue to rise as more and more workers experience physical strain in the workplace. According to the Occupational Health and Safety Administration there are over 647, 000 cases of work-related injuries to date. Apart from this, occupational injuries account for more than \$20 billion of the workers' compensation costs (USA Bureau of Labor Statistics, 1996). There are several types of biomechanical or ergonomic disorders. One of which is the carpal tunnel syndrome. The carpal tunnel syndrome or median neuropathy is a type of physical strain generally associated with computer workers.

It is one of the most common types of work related injuries primarily because of the widespread use of computers. Reports show that about 50 percent of computer workers experience this disorder's symptoms frequently. This condition roots from the overuse and repetitive manual activities such as typing which causes the median nerves to be compressed in the wrists. Individuals with this condition would usually feel numbness, muscle weakness, and sometimes even pain in the hands, arms, and fingers. Some patients even feel a pronounced pain or sensations at night.

As this injury progresses, the person may feel cramping and weakness in the hand. It can also lead to a decrease in grip strength. Sharp pains will also be frequent as it will cause the patient to suffer (Medicine. net, 2009). Lower back injury is another common type of musculoskeletal disorder in the work place. According to the Bureau of Labor Statistics, about 20 percent of occupational injuries are back injuries. Further, about a quarter of the employment compensation claims are back injury (USA Bureau of Labor

Statistics, 1996). This condition is often attributed to incorrect sitting postures.

Office workers are especially vulnerable to this injury primarily because they retain their sitting posture for hours. Apart from the posture, office equipments also contribute to this condition. Poorly designed chairs or computer table can highly affect the posture of the user. Sitting in such chair for long hours can easily result to lower back pains. Cumulative trauma disorder of the upper extremity is another type of ergonomics- related disorder. Similar to carpal tunnel syndrome, this condition is a result of repetitive manual work. This causes the body, such as the fingers, shoulders, and neck to feel pain.

Recent researches show that cases of cumulative trauma disorder of the upper extremities have increased over the years. The National Institute for Occupational Safety and Health even categorizes this condition as “ one of most significant occupational health problems today”. This is due to the fact that cumulative trauma disorder of the upper extremities account for about 56 percent of work-related injuries (Melhorn 1996, p. 1264). Cumulative trauma disorder of the upper extremities, carpal tunnel syndrome, and lower back injuries are all caused by excessive physical load.

In the research work entitled “ Biomechanical Aspects of Work Related Musculoskeletal Disorder”, Robert Radwin et al. (2002) explained that the terms “ physical load” or “ load” would refer to the physical stress acting on an individual’s body (Radwin et. al. , 2002, p. 153). Similarly, physical stress is the physical quality that makes up both the internal and external factors.

This includes kinetic force, kinematics, oscillatory, and thermal. Kinetic force would refer to the voluntary motions exerted against an external object such as pounding or string an object.

This type of pressure would then create a strain on the tendons and ligaments in the body. An increase pressure or force would result to a greater level of stress (Radwin et. al. , 2002, p. 156). Kinematics refers to the motions or movements that position the body. An uneven or unbalanced motion could cause angular displacement. This in turn, could create stress and load on the nerves as well as in the blood vessels. Consequently, oscillatory force creates pressure and load to the body. Oscillatory or external vibrations affects the not only the musculoskeletal system but also the body's vascular and nervous system.

Temperature of thermal measurement also plays an essential role to the performance and dexterity of an individual. Long exposure to cold environment for instance, can decrease the strength as well as the sensibility of the muscle. Most of these loads are affected by external factors such as the work place, office furniture, and energy sources among many others. Biomechanical factors like motions, exertions, body position, and forces also contribute to the physical load endured by the body. (Radwin et. al. , 2002, p. 154). Musculoskeletal disorders also come from various activities, repeated and accumulated over time.

Thus, individuals such as employees or workers who are exposed to as much as eight hours daily, experience work related disorders such as carpal tunnel syndrome and back injuries. This is largely because of the long and repetitive

activities that are transferred through the different parts of the body which then creates an internal load and stress on the tissues, nerves and ligaments. The combination of external and internal stress can add much stress on the ligaments and connective tissues of the body. Studies reveal that constant exposure to loads and stress can cause damage to the muscles and nerves.

One way of reducing this external stress is through ergonomics. Ergonomics is the science that deals with engineering machines and equipments in order to reduce stress on the human body. At the same time, it is also intended to increase human productivity by eliminating discomfort and fatigue (Answers.com, 2009). Ergonomically designed office and workplace furniture such as work desks, tables, chairs, and computers can effectively reduce the load on the human body. According to studies, ergonomic furnishings in the workplace do not only reduce the level of stress among workers, but it also optimizes and increases productivity.

Studies also reveal that there is a significant increase in efficiency levels as well as the quality of service in ergonomic-friendly companies. Employees also feel more motivated as they experience less stress and suffer fewer pains. A recent study conducted by Michael Smith and Antoinette Bayehi (2003) showed that an ergonomic controlled office increased the performance of call center workers by 50 percent. Over all, a total of 4.87 percent of output increase was recorded among the control group (Smith and Bayehi, 2003, p. 16).

Similar increase in productivity was also recorded in a research conducted in a silicon chip plant showed a 400 percent growth in productivity. This increase involves an increase in man hours as well as a decrease in work errors (Relating Productivity to Ergonomics, 2009, p. 3). Apart from productivity, studies and researches also reveal that companies who have decided to switch to ergonomically designed furnishings saved thousand of dollars in terms of compensation and insurance cost. A recent study showed that a steel company who redesigned their observation pit was able to save as much as \$150, 000 (Ergoweb, 2009).

With such benefits, it is only fitting that companies should address their work-related problems through ergonomics. This means considering essential office equipments such as tables, chairs, and computers. An office chair for instance, plays an important part in any office environment. This is because almost all employees spend their working hours sitting in their work desks. As such, a chair's height, width, depth, and back rest should carefully be considered. The chair's height should be adjustable or it should measure from 16 to 20 inches. This will allow the user to comfortably place his feet flatly on the ground.

When it comes to seat width, it is essential that the chair provides enough space so that the user will be able to seat comfortably. The standard width for most office chair is 17 to 20 inches. This leaves the user with enough space or room so that he or she can seat in ease (Ergonomics Safety Program, 2009). The back rest is also an important part of an ergonomic chair. Thus, the back rest should at least be 19 inches wide. Also, the chair

should have a lumbar support that adapts to the curvature of the user's back. An arm arrest should also be present as this will allow the user's shoulder and arms to relax.

Other factors such as the swivel function and the seat material must also be considered. The swivel function will allow the user to move around in his or her work desk with ease and comfort. Likewise, the chair's material should be soft enough so that the worker will be able to seat and work comfortably. The office desk or table is an office furniture that requires to be ergonomically designed. Along with the chair, the work desk is used by most office employees for long number of hours. Therefore, it is important that the work desk allows the users to frequently stretch in order to prevent muscle cramps and pain.

The table's height should be at least 23 to 33 inches. An adjustable table is also recommended so that the user's forearms are parallel to the floor. Similarly, the work space should provide enough leg space in order for the user to come close to the desk as possible (Ergonomics Safety Program, 2009). The work desk should also have enough room for the user to work properly. A writing surface of about 16 to 20 inches should be provided. Document holders and drawers are also necessary. Material-wise, it is important for the work desk to have a matte finish. This will eliminate the glare from the computer.

Desks with rounded corners are also recommended in order to prevent the arms or wrist from coming in contact with square or sharp edges. The positioning of the computer in the work desk is equally significant. The



computer monitor should be placed directly in front of the user. This means that the top of the screen must be parallel to the user's eyes. Apart from this, the monitor should be positioned in such a way that there is very minimal reflection and glare (Ergonomics Safety Program, 2009). The computer keyboard on the other hand, should be placed in such a way that the user will be able to reach it without extending his upper arm.

The forearms of should also be aligned floor so that the wrists will not bend while typing. This can be addressed by selecting a keyboard that can be adjusted and tilted. When typing, the arms should hang loose or it should rest comfortably in the desk to prevent the muscles in the shoulders from cramping (Daniels, 1996). Likewise, the computer mouse must be placed at the same area as the keyboard. This means that the click button of the mouse is aligned properly with the keyboards. Utilizing a mouse tray with trackballs can permit the user to use the mouse with ease and comfort.

This will also allow the wrist to relax while staying in a neutral position (Daniel, 1996). Although ergonomically designed work equipments can reduce the risks of occupational injuries and disorders, it is still important to remember that this alone, cannot make up for bad practice. Employees and workers must also be aware of the proper measures in order to reduce stress and injury. One way of doing this is to educate the employees about the seriousness and risks of office-related injuries. This can be done through seminars and workshops about office and workplace safety.

Memos and reminders about work place safety should also be frequently posted in the workplace. Distributing fliers and brochures about ergonomics-

related injuries can also help spread awareness. At the same time, the management should also set an example to the employees by following all the safety measures. Informing the employees about the different consequences as well as the benefits of this issue will allow them to be aware about this looming workplace problem. More importantly, this will encourage the employees to take the proper measures to prevent work-related injuries from happening.