

QAS 515 – Winter 2005
Term Paper - Prepared By: Van Do

Benefits of Ergonomics and Implementation of Ergonomics Programs in the Office Workstations

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Ergonomics programs (interventions) have been adopted by many employers to provide a safe and healthy work environment for employees and therefore maximizing work performances. This paper will focus on addressing the benefits of Ergonomics programs and then how ergonomic programs can be implemented through the example of office workstations.

Ergonomic injuries (such as musculoskeletal disorders) can be serious and expensive that affects hundred thousands of workers and cost the US economy billions of dollars every year due to the loss of time from work and treatment. Fortunately, these injuries are preventable when ergonomics is integrated into job training and ergonomic designs for workplace. The benefits of ergonomics programs have been reported to outweigh the cost of implementing ergonomics programs.

An important benefit from implementing ergonomics program in the workplace is to decrease the risk of injury to employees and therefore reduce the injury related cost. The National Academy of Sciences has estimated an annual cost of \$50 billion due to ergonomic injuries to employees, employers, and society as a whole. In California alone, in 1998 52,925 California workers suffered from ergonomic injuries that were severe enough to cause them to be away from work for at least one day. Among these workers, 27% of them had to be away from work for more than a month and over 60% had to be away from work for more than a week. This resulted in an estimated cost of 4.5 billion dollars. To protect employees and to reduce the injury related costs, the Department of Labor has investigated the causes and potential solutions to ergonomic injuries. The Department has also established regulations and standards to minimize the occurrence of ergonomic injuries. According to OSHA's estimate, the cost for complying with those ergonomics standards is about \$4.5 billion per year and the saving is approximately \$9.1 billion a year. This estimate has demonstrated that the cost of implementing ergonomics standards and programs are far outweighed by its benefits.

The benefits of ergonomics programs can also be demonstrated through the savings associated with low employee turnover, absenteeism, and poor morale. When ergonomics program is implemented, employees will appreciate the way in which the management

trying to improve their working conditions and be happier with their employers. They feel that the employers care about their health status and safety. In return, employees will feel more motivated to have good performance. Moreover, happy employees with good morale will stay with a company longer. This is also one of the major factors that affect staff retention which saves the company from the cost associated with hiring and training new employees.

Office ergonomics is an important aspect of Human Factor Engineering (HFE) and has been the topic of many discussions because office workstations are normally associated with repetitive tasks that can cause repetitive motion injuries (RMI) and have been linked to many musculoskeletal disorders (MSD). RMI hazards in the office workstations are usually associated with awkward postures, repetitions and cold temperature. The level of risks for injuries depends on the durations, magnitude and frequency of the tasks performed.

Typical causes for RMI that occurs in the office workstations are related to the tasks performed in the office, which includes reading, writing, talking on the phone and especially working with the computers. Injuries can be caused by employees having awkward postures while performing works or they can be caused by improper workstation arrangements or equipment design. Through the implementation of ergonomics program in the office workstations, these causes for injuries can be reduced. The first step in implementing an ergonomics program for the office workstations is to understand the symptoms of work related injuries and assessing their causes. Symptoms that usually observed in the office place are associated with the feeling of pain, numbness, tingling, burning, cramping and stiffness in the necks, backs, shoulders, arms and wrists. The causes for these injuries are varied from the person having awkward posture, improper use or setup of the mouse and keyboard or for not having good office equipment and designs. The identified causes for office work related injuries will be used to setup training for employees and for preparing appropriate improvement plan. Another important aspect of implementing an ergonomics program for the office workstations is training. Through training programs, employers can inform employees of the poor practices in the offices, the potential injuries, how and what can be done in order

to prevent injuries. From training, employees should be aware of the proper practices and/or activities that should be followed in order to reduce the risk of injuries.

Employee feedback is also very important in order to successfully implementing an ergonomics program. From employee feedback, employers will document and aware of all the risks or problems that employees experience. This will help them (employers) modify and/or strengthen their plan improve these conditions.

The next step to implement the ergonomics program in the office work stations is to execute implementation plans. There are many different countermeasures that can be implemented in the office workstations in order to reduce the risk of injuries and can be described below:

Proper posture while sitting:

- The worker needs to be able to reach the entire work area without stretching or twisting unnecessarily.
- The individual is sitting straight in front of and close to the work. The back should be straight and the shoulders relaxed.
- The work table and the chair should be designed so that the work surface is approximately at the same level as the elbows.
- If possible, there should be some forms of adjustable support for the elbows, forearms and hands.
- The chair should be of appropriate height for the work table or work bench. The seat height and the backrest height should be adjustable separately. The backrest tilt should also be adjustable.
- The chair should allow the worker to lean forward and backward easily.
- The worker should have adequate leg room under the work table and should be able to change positions of the legs easily.
- The feet should be flat on the floor. When this is not possible, the worker should be provided with a footrest. A footrest will also help eliminate pressure from the back of the thighs and knees.

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- The chair should have a backrest, which supports the lower back.
- The seat should curve slightly downward at the front edge.
- Armrests should not prevent the worker from getting close enough to the worktable.

Arrangement of the Workstation:

- Adjust the backrest so that the lumbar support rests at the small of the back at an angle between 90 to 110 degrees.
- Adjust the monitor so that the top of monitor frame is 2" – 3" above eye level.
- Make sure there is no glare on screen, anti-glare filter should be used if needed.
- Sit at least an arms length from the monitor.
- Adjust the chair height so that the feet are flat on the floor. Foot rest should be used if needed.
- Use an in-line document holder if transferring information from paper to computer is done routinely.
- Make sure the wrists are flat and straight in relation to forearms when using the keyboard and mouse.
- Adjust the keyboard tray so that the arms and elbows relaxed close to body.
- Center monitor and keyboard in front of the user.
- Adjust the keyboard to a negative tilt position.
- Use a stable work surface and stable keyboard tray with an attached mouse tray. Also make sure frequently items are within easy reach.
- Take frequent micro-break (every 30 – 60 minutes) to stretch or to get away from your workstation.

Adjustment of keyboard platform:

- When seated in chair typing position, keyboard is at about elbow height such that the elbows are at about 90-degree and the forearms parallel to the floor.
- Keyboard platform is positioned closed to the body so the arms are not extended while typing.

Keyboard usage:

- Type at elbow height when the arms are relaxed at the sides.
- The forearms are parallel to the floor.
- The wrists are straight.

Mouse usage:

- Use larger muscles of the arm to move the mouse around.
- Bring the mouse closer.
- Protect the wrists.
- Use the shortcut and function keys on the keyboard instead of the mouse whenever possible.
- Hold the mouse loosely in the hands with a relaxed grip.

Wrists and Hands:

- Avoid static postures.
- Avoid wrist compression/extension at keyboard and mouse.
- Alternate between right & left hand to mouse.
- Interrupt typing and mouse use with mini-breaks.
- Use full arm motions while typing or using mouse.

Elbows & Forearms:

- Maintain keyboard weight so forearms are parallel to the floor or slightly lower.

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- Sit close enough to the keyboard and mouse so your upper arms are vertical.
- Make sure your armrest is adjusted to elbow height.

Shoulders, necks & Backs:

- Avoid excessive reaching.
- Avoid flexing/extending neck by adjusting your monitor distance/height.
- Avoid supporting the telephone with shoulders.
- Maintain the monitor & keyboard center with the body.
- Maintain a proper upright seating posture.

It is also important when an ergonomics assessment performed for each employee using the criteria listed above. These criteria are used during the evaluation in order to find out the area or practices that need improvements. Results from the assessments and recommendations should be presented to the employees so he/she can be aware of her habits and how she/he can improve them in order to prevent work related injuries.

Periodic evaluation of effectiveness is also an important success factor in implementing the ergonomics program. Survey should be done with employees to evaluate the effectiveness and or problems of the ergonomics program. Based on the evaluation, further training, modification will be performed for continuous improvements.

In conclusion, the benefits of ergonomics programs are beneficial to both employers and employees. They do not only protect employees from work related injuries but also save employees from injuries related cost. Depending on the working environment, there are many ways that ergonomics principles can be applied to improve the working conditions. Tools and information are available to achieve a successful ergonomics program.

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