

Clemson University Ergonomics Plan

Purpose

This Ergonomics Plan is established to prevent the occurrence of work-related musculoskeletal disorders, primarily those in the back, upper and lower extremities. To do this the program employs various strategies:

1. Informs employees about musculoskeletal disorders and the risk factors that can cause or aggravate them.
2. Promotes continuous improvement in workplace ergonomic protection.
3. Encourages new technology and innovation in ergonomic protection.
4. Identifies design principles that prevent exposure to risk factors.
5. Ensures ongoing and consistent management leadership and employee involvement.

Clemson University Environmental Health and Safety (EHS) is responsible for managing the Ergonomic Protection Plan. The ergonomic program health care provider, supervisors and the Office of Risk Management will assist in monitoring the effectiveness of the program.

Worksite Analysis

EHS, with assistance from affected employees and their Supervisors, will conduct an ergonomic hazard analysis when requested by either an affected employee or his/her Supervisor. The purpose of worksite analysis is to recognize and identify existing ergonomic risk factors in the workplace. The analysis may include the use of an ergonomic checklist and employee questionnaire. Surveys of the high risk areas will be conducted at appropriate intervals to evaluate changes in risk factors and effectiveness of work practices and engineering controls.

The OSHA 200 log will be reviewed by Risk Management to determine whether any musculoskeletal disorders have occurred during the last two years. If musculoskeletal disorders have occurred in the past two years, Risk Management will request that EHS evaluate the associated "at risk" work areas for ergonomic hazards

Each "at risk" task may be videotaped for the purpose of documenting work procedures, tools and materials used, and hazardous conditions encountered. EHS will analyze the task for ergonomic related hazard that could result in injury or illness.

The following risk factors will be considered in the analysis:

1. Performance of the same motions or motion pattern every few seconds for more than two hours at a time.
2. Fixed or awkward work postures for more than a total of two hours: for example, overhead work, twisted or bent back, bent wrist, kneeling, stooping, or squatting.
3. Use of hand tools.
4. Manual handling of objects more than 25 pounds more than once each workshift.

5. The type of handwear being used.
6. No worker control over work pace (e.g., work is mechanically or electronically paced) for more than four hours at a time (exclusive of regular breaks.)
7. Work performed in cold environment.

Computer Workstation Evaluation

EHS will work with departments to identify potential risk factors associated with computer workstations. EHS will conduct a workstation analysis upon request for each affected employee and make recommendations to the department head for needed changes. If a workstation analysis indicates that no ergonomics problems exist, the results of this evaluation will be forwarded to the appropriate supervisor.

When concerns/problems are identified, EHS may recommend any of the following corrections:

1. Changes in work practice technique;
2. Modifications to the existing workstation (an effort will always be made to work with existing equipment; and/or
3. Purchase of ergonomics equipment (e.g. wrist rests, tracking balls, lumbar support chairs, etc).

The department head/supervisor will be responsible for working with their Dean/Director to implement recommended corrections.

PC Displays

Most new PCs have separate, adjustable keyboards and display screens that allow both the keyboard and display screen to be positioned appropriately for the employee. This is important because PC operators may spend a considerable amount of time looking at the display. The height of the display screen surface must be determined in relation to the task and the operator's height. In addition, screens that swivel horizontally and tilt or elevate vertically enable the operator to select the optimum viewing angle.

The topmost line of the display should not be higher than the user's eyes. The screen and document holder should be the same distance from the eye (to avoid constant changes in focus) and close enough together so the operator can look from one to the other without excessive movement of the neck or back. The incline of the document holder should be adjustable.

The preferred viewing distance for PC monitors ranges between 18 and 24 inches. To this distance must be added the depth of the display itself. Some displays are as much as 20 inches deep. The best way to deal with this, other than increasing table depth, is to install a keyboard extension on the front of the desk.

Legibility is also a primary consideration in selecting a display screen. Legibility factors to be considered include symbol size and design, contrast, and sharpness.

Keyboard

The keyboard should be detachable and adjustable to ensure proper position, angle, and comfort for the operator. A lower than normal work surface may be required to keep the operator's arms in a comfortable position. The thickness and the slope of the keyboard are critical in determining the preferred height. The keyboard and table, therefore, have to be selected in relation to each other, or the surface must be adjustable. Options for keyboard placement also should be considered in choosing the size and adjustability of the work surface.

The preferred working position for most keyboard operators is with the forearms parallel to the floor and elbows at the sides, which allows the hands to move easily over the keyboard. The wrist should be in line with the forearm. A padded and detachable wrist rest for the keyboard can help keep the operator's wrists and hands in a straight position while key stroking.

Operating a PC, like any form of sustained physical or mental work, will eventually lead to fatigue. It may take the form of visual fatigue, muscular fatigue, general body fatigue, or mental and psychological fatigue. Rest pauses to alleviate or delay the onset of fatigue may be necessary. The frequency and duration should be determined by the employer and should depend on the task involved, the pattern of work, and the individual PC operator concerned.

Eyestrain

Eyestrain is one of the most common complaints among computer operators. Routine eyestrain is both normal and temporary, but the risk of eyestrain may be increased by intensive use, inadequate or detrimental lighting, poor monitor adjustment, or preexisting eye conditions.

A number of preventive measures may be taken:

Intensive use: The eyes should be refocused every ten minutes or so. In addition, the recommended policy on breaks should be followed. Variation in job design which allows for some less eye-intensive tasks during the course of the workday can also alleviate eyestrain.

Poor monitor adjustment: Computer terminals are equipped with brightness and contrast controls. Research is currently being conducted into the relationship between terminal colors and eyestrain and may provide more guidance in the not too distant future. In general, soft, soothing colors should be preferred over more garish combinations. Finally, the monitor should be positioned an adequate distance away from the operator. The screen should be an arm's length away from the operator and the first line of text should be at or slightly below eye level.

Preexisting eye conditions: The intensity of terminal work may reveal preexisting eye problems that were not apparent under less demanding conditions.

Corrective Actions

EHS along with assistance from the area Supervisor will determine the surface and root causes for all hazards (ergonomic and general) related to a task being analyzed. The following control strategies will be used to reduce or eliminate those hazards:

- 1. Engineering controls.** These may include workstation redesign, tool and handle redesign, and change of work methods. The goal is to make the job fit the person.
- 2. Work practice controls.** This may include proper work techniques, new employee conditioning, and monitoring and modifications as necessary to reduce ergonomic stressors.
- 3. Administrative controls.** These controls will be designed to reduce the duration, frequency, and severity of exposure to ergonomic stress. These controls may include job rotation, reduction of repetitions, and preventive maintenance of related equipment.
- 4. Personal protective equipment (PPE).** PPE may be used if appropriate. However, in all cases, if employees are not properly trained, or are reluctant to accept change, reducing ergonomic injuries and illnesses may be difficult at best.

Employee Involvement And Training

Management will be involved in all stages of identifying, assessing, and controlling ergonomics hazards. Managers and supervisors will work closely with EHS and affected employees to determine hazards. Training in ergonomic awareness and safe work practices is key in ultimately reducing injuries and illnesses, and involving employees in this training will improve the interest and quality of the training

All supervisors and employees will be offered training on the early signs and symptoms of ergonomic injury and illness.

Further ergonomics training will be conducted for all “at risk” employees and their supervisors, and will include specific information on the hazards associated with their jobs, reporting procedures, the risks of developing cumulative trauma disorders, symptoms of exposure, and how to prevent the occurrence of cumulative trauma disorders. A supervisors training program will also be offered to allow recognition of the signs of cumulative trauma disorders and to reinforce the ergonomics program. After training is completed, supervisors will provide regular feedback on work practices to their employees.

Cumulative Trauma Disorder (CTD) Management

Appropriately trained health care providers are available at all times, and on an ongoing basis as required. They are knowledgeable in the prevention, early recognition, evaluation, treatment and rehabilitation of CTDs, and in the principles of ergonomics, physical assessment of employees, and OSHA recordkeeping requirements.

Supervisors should conduct monthly, systematic workplace walk-through to remain knowledgeable about operations and work practices, identify risk factors for CTDs in the workplace, identify potential light duty jobs, and maintain close contact with employees. Findings and recommendations indicating a need for further assessment will be documented and reported to the EHS as soon as possible after the walk-through is completed.

All employees who report pain or other symptoms possibly related to musculoskeletal disorders will be promptly evaluated by a health care provider, and appropriate treatment and follow-up will be provided.

Where an employee states that the injury or illness is work-related, and the case otherwise meets the criteria for recording, the case will be entered on the OSHA log pending final determination of the cause.

The employee will be monitored until he or she is able to perform work without restrictions. The idea is to detect any problem as early as possible to reduce the severity of the injury and associated costs.

The Supervisor, with assistance from EHS, will compile a list of light duty jobs with the lowest ergonomic risk. For such jobs, ergonomic risk(s) will be described.

Program Evaluation

This Ergonomics Plan will be evaluated by EHS and Risk management annually for its ability to identify, assess, and eliminate ergonomic hazards in the workplace. Reductions in ergonomics related injuries and illness should ideally be experienced soon after the program is implemented.

Findings of the evaluation will be reported directly to the Directors of EHS and Risk Management.

Ergonomic Hazard Analysis

The following is an checklist to aid in an ergonomic hazard analysis of a specific job or workstation. It is designed to used as a supplement to close visual observation or videotaping of the job/workstation.

Person performing analysis _____ Date _____

Job location _____ Bldg _____ Floor _____

Job name _____

Department _____

Job description _____

Number of employees on job _____

Line speed _____ (pieces/minute)

Jobs rotated with _____

Rotation schedule _____

Break schedule _____

Workstation:

____ 1. Are there any sharp edges?

____ 2. What is the height of the work table? _____

____ 3. Adjustability:

____ Can tools be moved around in the workplace?

____ Can the work surface height be adjusted vertically?

____ Can fixtures be tilted or rotated?

____ 4. What is the worker standing on? _____

(e.g., grate, mat, concrete floor)

____ 5. Is the floor or platform slippery? _____

Postural

____ 1. Can worker change postures (sit-to-stand or stand-to-sit)?

____ 2. What are the maximum reach distances in inches?

Vertical ____ Horizontal ____

Tools

____ 1. Name of tool _____

____ 2. Type: Torque _____ reciprocating or vibrating _____

Other _____

- ____ 3. What is the weight of the tool? _____ lbs.
- ____ 4. Size of the handle: Span ____ inches, length ____ inches
material _____
- ____ 5. What is the source of power? _____
(e.g., air, electric)?
- ____ 6. If air, is the exhaust away from the hand? _____
- ____ 7. Is the tool counterbalanced? _____

Manual or hand tools

- ____ 1. Name of tool _____
- ____ 2. Weight _____ lbs.
- ____ 3. Size of the handle: Span ____ inches, length ____ inches
material _____
- ____ 4. Is there a place for tools in the workplace? _____
(e.g., holster, fixture)

Miscellaneous

- ____ 1. Are other objects or materials handled? _____
- ____ 2. What are they and what do they weigh?
Name _____
Weight _____ lbs.
- ____ 3. What is the temperature of the work environment?
_____ degrees (C./F.)
- ____ 4. What personal protective equipment is used ? _____
(e.g., gloves, hard hats, aprons)
- ____ 5. Can the worker stop or control line speed?
- ____ 6. Are there opportunities for micro rest pauses?
If so, how many seconds? _____
- ____ 7. Estimate exertion or effort required to do the job (1 to 5)
_____ 1=low, 5=high

Computer Workstation Hazard Analysis

_____ Viewing distance 18 to 20 inches.

_____ Display angle - Tilt and swivel should be adjustable.

_____ Display height - Adjustable so that proper viewing angle can be maintained, with the top of the screen at about eye level.

Screen characteristics:

_____ Adjustable brightness and/or contrast.

_____ No perceptible flicker.

_____ The dot matrix that forms each character should be at least 5 by 7 dots; 7 by 9 dots or more is preferred for greater clarity.

Keyboard location:

_____ Adjustable position, so that proper viewing distance from the screen can be maintained.

_____ Adjustable height, so that proper arm and wrist angle can be maintained. Forearm should be parallel to the floor (at right angles to the chest), and wrist should be straight.

Foot rests:

_____ If necessary to provide firm foot support; otherwise, feet should be flat on the floor.

Leg room:

_____ Enough for unrestricted movement while sitting straight, with space between the desk and the top of the thigh.

Arm rests:

_____ Removable preferred so that operator can exercise his or her preference.

Seat height:

_____ Easily adjustable; a range of 16 to 20 inches should allow most operators to maintain a proper posture.

Back rest:

_____ Height and tension is easily adjustable to provide firm lower back support.

Wrist rest:

_____ Optional at operator's request - for intensive keyboard use.

Document holder:

_____ Positioned so that documents are near to, and at the same angle as, the terminal screen - to minimize eye, head, and neck movements.

Note: Allowing all operators to assume an ideal posture is not the sole aim of adjustable furniture and equipment. No person can comfortably maintain a single posture for an entire day. People constantly shift positions to prevent fatigue and stiffness; furniture and equipment should be designed to allow for this natural movement.