
 <b>Department of Corrections and Community Supervision</b>  <b>DIRECTIVE</b>	TITLE <b>Computer Workstation Ergonomics</b>		NO. 2823
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REFERENCES (Include but are not limited to)	APPROVING AUTHORITY 		

**I. POLICY:** It is the policy of the State of New York and the Department of Corrections and Community Supervision to provide a work environment for employees who use computers that is free from hazards, provides a reasonable degree of comfort to the employee and enhances his/her productivity. Since specific employee needs differ due to diverse agency objectives, organizational designs, and physical environment, each State agency shall develop an appropriate program to integrate this policy into their computer operations.

NOTE: Additional supporting material not contained in this directive is identified by an asterisk followed by title and description. Every Superintendent, Central Office Division Head and Regional Director can access this additional information on line at the GOER website: [www.goer.ny.gov/ergo](http://www.goer.ny.gov/ergo) or by calling GOER at (518) 473-8766. To access this material from the on line web page document, simply select the available hyperlink (in Blue) within each section of the corresponding GOER document that you wish to view. See first example listed below.

\* *Elements of an Ergonomics Program* (Section C, steps 1-7) are included to aid in the development of a program.

Priority should be given to employees with computer activities as their primary task. Attention should focus on training, workstation design, proper illumination, control of glare and reflections, equipment set up, and maintenance. Alternate tasks that allow work routine variations for full-time computer users should be incorporated as necessary.

Computer operators and their supervisors should be provided with appropriate training. This includes awareness of recommended workstation design and fitting for various sized users, adjustment of equipment including chairs, keyboards, monitors, input devices, lighting recommendations, potential health effects that could result from computer use and how to report and manage the hazards. Health effects include musculoskeletal problems, eyestrain and headaches, and stress caused by awkward and static (unmoving) postures, as well as repetitive motions used to operate the keyboard and input devices.

In order to assist departments and agencies in the implementation of these guidelines, the labor/management safety and health committees, as well as their respective union, have designed a number of training programs for computer users and their supervisors.

#### A. Definitions

Ergonomics: The science of fitting workplace conditions and job demands to the capabilities of employees who perform the work. Taking into account the variability in human capabilities when selecting, designing, or modifying equipment, tools, work tasks, and the work environment. Employees vary in size, shape, age, physical condition, training and preexisting medical conditions. Factors involved in computer ergonomics include the equipment and its adjustability, workstation furniture, lighting, ventilation, and noise.

1. **Full time computer use:** Employees assigned to computer operations for four or more continuous hours or a major portion of the employees' working hours.
2. **Work routine variations:** Periodic interruptions in computer operation and use to perform other work related tasks. This will reduce visual and muscular fatigue and tension.

**II. GUIDELINES:** All Correctional Facility Superintendents, Central Office Division Heads and Regional Directors are responsible for referencing these guidelines to address ergonomics considerations regarding workstation design, work surfaces, furniture, equipment and environmental lighting conditions.

Superintendents, Central Office Division Heads and Regional Directors are also responsible for the review of all ergonomic requests. The review and evaluation of these requests should be coordinated with the Central Office Americans with Disabilities Act (ADA) Coordinator, MIS and the Support Operations Unit. There are ergonomic keyboards, monitors and assisted mice available from preferred vendors and are in most cases, equivalent in price to the currently procured non-ergonomic items. In addition, staff should be made aware of and encouraged to participate in ergonomic training programs where needed.

**A. Workstation Assessment Guidelines**

The potential for musculoskeletal problems is reduced with proper design and adjustment of workstations. Guidelines for agencies have been developed from national standards for computer workstation design and setup. More details of these guidelines are readily available online. See references. Agencies should develop the capacity to assess computer workstations. Assistance may be obtained from GOER, Union Health and Safety Departments, or through Department of Labor Division of Safety and Health.

1. Chair Characteristics

- a. Seat height allows the operator to comfortably place the entire foot flat on the floor, or flat on a footrest, and should be easily adjustable. For petite employees (five feet or less), use a chair designed for their height. A footrest may be necessary. Most users can use standard office chairs, but if there is a body size and chair or furnishing mismatch, there are chairs and other equipment available to accommodate petite, taller, and larger workers. \*(Table 1 Human Factor Chart)
- b. The front edge of the seat pan should be adjusted so that it does not push against the back of the lower leg under the thigh and behind the knee.
- c. The seat pan should be properly sized for users, for hip width and thigh length. Larger chairs for very tall or full-sized employees are available as are smaller sized chairs for the petite employees.
- d. The backrest should support the back in a comfortable, upright posture with ample support for the lower back. The backrest should tilt back independently of the seat pan.
- e. Removable and adjustable arm rests, if used, should allow the operator to assume a comfortable position with relaxed shoulders and arms. The bend at the elbow should be approximately 90 degrees at the elbow or lower with forearms, hands, and wrists at elbow height in a straight line almost parallel to the floor when operating the home row. Armrests should have a minimum inside distance at least equal to the width of the hips of the operator (many workers choose not to use arm rests for keying).
- f. Chairs bases must have 5 legs and casters appropriate to the floor covering.
- g. Chair padding can minimize pressure points on the seat pan, backrest, and armrests. A rounded or "waterfall" (scrolled) forward edge of the seat pan is desirable.
- h. Replace chairs when foam padding, springs, locks, or gas cylinders wear out, or the chair is functionally broken or worn out. \*(Table 2 Ergonomic Chair Evaluation)

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## 2. Workstation Characteristics \* (Table 3 Workstation Adjustment Guidelines)

### a. Keyboards

Keyboard trays or other adjustable surfaces that support the keyboard and input device should be easily adjustable for height and depth and have reverse angle capabilities to accommodate a range of employee heights and comfort levels. Recommended seated postures include sitting in a comfortable upright position, with the upper arms hanging loosely from the shoulders, the keyboard home row at elbow height, forearms held nearly parallel to the floor, and the wrists in a neutral or straight position. Neutral wrist positioning is critical for preventing carpal tunnel syndrome, which is due to a compression of nerves in the wrist. Shoulders should be relaxed and upper arms should be positioned close to the body. \*(Table 4 Neutral vs. Awkward Wrist Postures)

Keyboard trays should be large enough to support the input device (mouse, trackball, joystick, etc.) at the right or left end of the keyboard, determined by the dominant hand. Position the input device close and low enough so that the arm does not need to be raised or extended away from the body to use the device. Separate smaller adjustable surfaces are available for supporting the input device if needed, and various slide, pivot or swing designs are often integrated into the keyboards trays. \* (Table 5 Mouse Usage “Do’s” and “Don’ts”)

### b. Monitors

Proper monitor height can minimize stresses from awkward head postures. Position the primary viewing area to 5-10 degrees below the line of sight to the horizon when the head is held up straight. Avoid extreme downward or upward head tilt. For most users, the top of the screen should be positioned at eye level when looking ahead, with the head held in a comfortable position. Various options are available for supporting the monitor. Paper or other similar material such as wood or plastic blocks may be used to raise the monitor to the optimal height. Most users tend to position the monitor too low.

### c. Screens

- (1) Position the screen at arms length, or a distance determined by user eye comfort, generally between 18-26 inches. “Computer” glasses that ensure proper focus on the screen will help prevent eyestrain if the user needs vision correction. Check employee benefits for eyeglass coverage. There must be adequate work surface area to permit proper placement of the monitor. If the work surface is narrow, flat screens can be used.
- (2) The workstation should allow enough room for the legs to be positioned comfortably. Restriction of leg and knee room underneath the work surface top, legs, modesty panels, wastebaskets, or storage of personal items may lead to highly constrained or awkward working postures.
- (3) Provide adequate workspace for papers, reference documents, etc., on both sides of the monitor.
- (4) If needed, position document holders so that reading material is at approximately the same height, angle, and distance from the user as the monitor screen.

### d. Telephones

- (1) Telephone headsets should be provided for computer operators who frequently use telephones as part of their normal work activities. Educate computer operators on the risk of injury from holding the telephone between their head and shoulder.

- (2) Alternate or split keyboards are available to help keep wrists neutral or straight when elbows are held outwards. There are many models compatible with PC computers but all work on the same principle.

e. Input Devices

Input devices such as mice, trackballs, touch pads, and joysticks are readily available for PC-based computers. Some persons have discomfort with one device, but can readily operate another. For instance, mice are available in various designs and sizes for left and right hands. Tasks, such as graphic arts may be more efficiently performed with a tablet and stylus. Some workers simply prefer one unit over another. Due to the low cost of these devices, users should be able to choose a more suitable device if they are experiencing discomfort. All cords for these devices and keyboards should be long enough to prevent awkward positioning of the equipment; and cordless devices are now available.

f. Radiation

Concerns about ionizing radiation (X-rays) and birth defects from computer use have been thoroughly studied in the US and Europe over the last 20 years. However, adverse health effects, including harmful effects on the fetus have not been found in recent studies. Non-ionizing radiation in the form of electric and magnetic fields are measurable from the Earth's magnetic field and wherever electricity is used. Monitors, like all electric devices, emit electric fields within a few inches of the screen; (this is why dust is attracted to the surface). However, electric fields do not extend far and are negligible at the distance of the chair. Magnetic fields may extend farther, up to one foot from the screen and up to 2-3 feet from the sides and back. For this reason, workstations should be arranged so that workers maintain these distances from adjoining units. No health effects have been noted from electric or magnetic fields of these strengths, despite many large studies over the years. Laptops emit far less than older cathode ray tubes (CRT) type monitors. Some studies suggest that sedentary work and/or work stress can be a contributing factor for miscarriage. Pregnant workers are encouraged to discuss the work environment with their health care provider.

3. Laptops

Laptops are now used by many field personnel and offer the benefits of portability. However, these units are not designed for full time or extended use. Their small screens and keyboards can present problems during extended use. If the laptop is to be used for extended periods or at remote locations, make available full-sized keyboards or docking stations. The laptop and screen should be elevated to the line of sight or slightly below using available materials such as phone books. During extended use, chairs should be properly adjusted and provide adequate back support. A full-sized monitor may be used if the screen is too small.

4. Adjustability

Adjustability of chairs and workstation components is important for achieving a comfortable working posture. Mechanisms are easy to operate and do not require tools. Keep instructions with the equipment, or readily available for use. Adjustability is especially important if several workers use the same workstation or if the same workstation is used over 2 to 3 shifts. \* ([Table 6 Tips for Adjusting Your Task Chair](#))

5. Work Organization and Stress

- a. Work organization or the way tasks are performed or managed may influence biomechanical stressors at computer workstations. Modified rest breaks, job rotation, or expansion of tasks to include non-keyboard work will reduce repetition, stress, and risk of injury.

- b. Computer operators should have frequent brief interruptions from key stroking at regular intervals, such as every 30 minutes, throughout the shift, during which they can give their hands, wrists, and eyes a break. Periods of from 30 seconds to five minutes are recommended. These exercises do not replace proper workstation adjustment and equipment.
  - c. Operators should shift positions regularly. Perform stretching exercises in consultation with their medical care provider. \* (Table 7 Ergonomic Exercises)
6. Office Environment

A healthy office environment can minimize stress experienced by computer users. Excessive noise, poor office ventilation, high humidity, and especially poor lighting and glare can cause discomfort. Eyestrain causes headache and sore, irritated, tired eyes, and is the most frequent physical complaint of computer users. However, the latest evidence does not support any long term or permanent adverse health effects on the eyes from full time computer use.

\* (Table 8 Q & A About Vision Factsheet)

a. Lighting

Ambient light near computer use areas should be lower than lighting in traditional office settings. At worksites occupied solely by computer users, lighting intensity ranging from 30-50 foot-candles or 300-500 lux is recommended. For computer workstations in areas with multiple uses, lighting intensity ranging between 50-70 foot-candles or 500-700 lux is suggested.

Maintain room lighting at levels that reduce eyestrain and glare. Adjustments can be made as appropriate. To control glare, the following steps can be taken:

- (1) Ensure contrast and brightness of the monitor is properly adjusted; these controls can be adjusted by the user to compensate for changes in ambient (surrounding) lighting conditions and to improve image clarity. (Certain color combinations, i.e. pink and light blue, can increase eyestrain. Choose high contrast colors such as the traditional black on white.)
- (2) Keep screen clean. Electrostatic charge on screens and similar equipment such as televisions causes dust to be attracted to the screen, this is normal.
- (3) Use recessed or indirect lighting or diffusion filters over lights.
- (4) If possible, do not position workstations directly below lighting fixtures, or remove bulbs or tubes of fixtures directly above, in consultation with management and facilities personnel.
- (5) Position monitors at right angles to windows.
- (6) Use window curtains, blinds, or window treatments (darkened or reflective films) to reduce direct sunlight and glare from windows. Getting up to reposition or adjust blinds and curtains during the day may constitute a “micro break” from computer use. In general, direct sunlight will be worst in east and west facing windows, when the sun is lowest in the sky (near winter solstice) and when the ground is snow covered.
- (7) Ensure that monitors are not tilted upwards towards overhead lighting. Instead, raise monitor and tilt it down. Refer to the instruction guide on how to adjust the monitor. If the monitor is difficult to tilt, try gently shaking it while holding your hands on opposite sides of the unit. For example hold the monitor with one hand on the top corner and the other hand on the opposite bottom corner (in a diagonal plane).
- (8) Use a monitor hood around the top and sides of the unit.

- (9) Ensure that paint, wall coverings, and equipment has a matte, non-reflective coating or color.
- (10) As a last resort, glare screens may be appropriate. Although, if the steps above have been taken, they are generally not needed. Their use is discouraged for several reasons:
  - glare screens add a surface that should be cleaned regularly
  - glare screens reduce the clarity of characters
  - glare screens are costly

If privacy of data is important, attempting to shield the monitor may lead to awkward positioning by workers. In these cases, a privacy screen is appropriate. These polarized filters look the same as glare screens, preventing any but direct line of sight viewing. They are very effective in completely hiding the screen from unauthorized viewers when needed. \* ([Table 8 Q & A About Vision Factsheet](#))

b. Ventilation

Follow accepted national standards for ventilation, (ANSI/ASHRAE 62-2001).

c. Noise

Follow accepted national standards for noise, (*OSHA Standards-29 CFR, subpart G, Subpart Title: Occupational Health and Environment Control, Standard Number: 1910.95, Title: Occupational Noise Exposure*).

d. Cabling

Ensure that electrical cords and cabling are installed and routed safely in accordance with National Electrical Code guidelines. Prohibit loose, untidy coils of wire, particularly in or near aisles.

7. Maintenance

Computer equipment and workstation furnishings shall be inspected periodically by the operator, and serviced or replaced when needed, to ensure proper functioning, workable adjustments, and equipment such as screens are clean. Chairs and foam padding especially will wear out and may need replacement or refurbishment. Instruct operators how to report maintenance problems.

8. Training

The designated Data Processing Liaison (DPL), the Regional Training Lieutenant (RTL), the Regional Training Coordinator (RTC) and the Division of Management Information Systems (MIS) shall support the Department's action plans for compliance with the Statewide Ergonomics Policy, respond to requests for evaluation and assessment of computer workstations, and arrange for training on ergonomics issues where needed.

Ergonomic problems related to computer use may be substantially reduced by training computer operators. Awareness of the safety, health, and ergonomic issues related to computer use can reduce the risk of developing problems.

Develop and implement appropriate training designed to address the following:

- a. Appropriate ergonomic relationships between the user, the keyboard, chair, and monitor, so that the "least risky" recommended posture can be used, with back upright, head held erect, forearms parallel to the floor, wrists straight and shoulders relaxed.
- b. Users should know the names of basic chair parts, and know how to inspect and adjust the chair, keyboards, trays, work surfaces, and other equipment that may impact their use of the computer.

- c. Symptoms of musculoskeletal complaints that could arise from computer use, and how to report pain and concerns to their supervisors.
  - d. How to minimize or reduce visual problems such as glare from windows, reflections, etc.
  - e. How to ensure continuity of the ergonomic skills of workstation evaluators/assessors and trainers.
  - f. How to access many effective and readily available (free) web-based computer ergonomic training tools (provided computer is equipped with web access). These sites are provided by Federal OSHA, IBM, Cornell, and many other universities.
9. Medical Management Program
- a. Early identification and treatment of injuries is critical to successful recovery. Employees experiencing pain or discomfort should be encouraged to report this to their designated supervisor. Additionally, the workstation, equipment, and work environment of employees who report pain or discomfort should be evaluated to see if it meets these guidelines. Agencies that do not have qualified personnel to conduct such evaluations may request assistance through GOER, the union health and safety departments, or through PESH (NYSDOL) consultation.
  - b. Employees who are experiencing pain should be encouraged to see a qualified occupational physician for diagnosis and treatment. The New York State Occupational Health Clinics network provides a multidisciplinary approach in diagnosing and treating occupational illnesses such as musculoskeletal disorders. Agencies should provide information about the availability of these clinics to employees.
10. Ergonomics Committees: The Department realizes that user input is helpful in the development of ergonomic processes and procedures and the Department will consider recommendations from the respective Health and Safety Committees that have been established to address ergonomic job processes, including workstation ergonomics, at such time that this policy directive is reviewed.

**III. IMPLEMENTATION:** The focus of implementation is on individual workstations because of variations in job assignments, equipment and office environments. Staff can usually improve their own workstations and environment by following the guidelines outlined above, bringing deficiencies to the attention of supervisory staff, and consulting with their Data Processing Liaison (DPL).

The Division of Support Operations shall ensure that office workstation equipment purchases and leases of office spaces in non-State owned buildings support the policy and guidelines stated in this directive.